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Contents

	PAGE
EDITORIAL NOTES: A Christmas Greeting; The Problem of Cheap Oxygen; The Lesson of "Synthetic" Gold; "Credulo-Chemistry"; Employment in Lead Processes; A Bibliography of Science	787
Sterilisation of Water Supplies	790
Safeguarding of British Glass	791
Safeguarding of Industries Act: Evidence in the Calcium Carbide Inquiry	792
Referee's Decision on Gas Mantles; Death of Mr. H. Oertling	794
Society of Chemical Industry (Newcastle-on-Tyne Section)	795
New Method for the Preparation of Gluconic Acid; The Affairs of Mann and Cook	796
Revised Sulphate of Ammonia Prices; The Peachey Process Company	797
Scrap Iron Drums Contract; American Notes	798
From Week to Week	799
References to Current Literature	800
Patent Literature	801
Market Report and Current Prices	804
Company News; Alleged Superiority of German Dyes	807
Commercial Intelligence; Chemist's Wrongful Dismissal Claim Fails	808

CHRISTMAS HOLIDAYS.

The offices of "The Chemical Age" will be closed from 6 p.m., Friday, December 23, to 9 a.m., Wednesday, December 28.

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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A Christmas Greeting

THE CHEMICAL AGE offers hearty Christmas greetings to its readers in every land, and wishes them a New Year of prosperity and progress. Fortunately it is possible to offer the latter wish to-day with some degree of sincerity and with reasonable ground for expecting its fulfilment. Evidence from within the trade, covering the last few months, consistently supports the view that the curve has reached its lowest point, and is now moving upward again. Returns from large British trading firms show a small but consistent increase of turnover since about September last, and the briskness of inquiry points to a further and steady recovery when we settle down to the business of the New Year and commercial and industrial conditions become more stable. From every side the prospects are many degrees better than at any period during the last twelve months, and the confident expectation of improved conditions appears to be based on solid grounds.

Next week the main developments in 1921 will be dealt with in our Annual Review number, which will be the largest issue of THE CHEMICAL AGE yet published. The contents will include a carefully-prepared retrospect of the principal events of the year, a review of the recent extremely important scientific and commercial developments in the nitrogen industry, by Dr. E. B. Maxted, an historical and critical survey, distinguished by exceptionally full and intimate knowledge, by Mr. W. J. U. Woolcock, M.P., of "Chemical Industry and Recent Legislation," an important contribution by one of the best authorities on chemical trade movements in 1921 and on future prospects, a summary by our Patent expert of the principal chemical inventions of the year, and brief records of the work of the leading chemical societies and allied organisations. The demand for this number is already large, and our acknowledgments are offered in advance to the many distinguished writers who have contributed to it.

The Problem of Cheap Oxygen

ABOUT twelve months ago we referred to the possibilities which would be opened up if the cost of industrial oxygen could be substantially lowered. Unfortunately the problem of producing cheap oxygen is a particularly aggravated one, and little hope for a reduction in price can be looked for in this country beyond the small decline which will, no doubt, result from the general tendency towards lower labour charges. The Americans, perhaps, are apt occasionally to be a little premature in speaking of their successes, but we have some considerable regard for the work of Mr. E. A. W. Jefferies—and Mr. Jefferies tells us that "the problem of the cheap production of oxygen has been solved." There are probably few of our readers who are not acquainted with the Jefferies-Norton system and who do not know of the successful demonstration of the system on a large scale for the U.S. Government in connexion with the separation of helium from natural gas in Texas. On the face of it, it would seem that if the plant proved its capabilities with helium, there should be no question of its ability to produce oxygen, and, as an oxygen programme is now in hand, many in this country will await with more than ordinary interest the results which Mr. Jefferies should be in a position to divulge in the near future.

As an idea of what in America they mean by cheap oxygen it may be mentioned that as produced by existing methods the gas compressed into cylinders costs from 10 to 15 dollars per 1,000 cubic ft. With the Jefferies plant, on the other hand, it is claimed that oxygen may be made for 8 cents per 1,000 cubic ft. when the plant has a comparatively

large capacity of 4,000 cubic ft. per minute, while the cost is 28 cents with a smaller plant having a capacity of one-tenth of the first named. These figures must, of course, vary with the local costs of fuel and labour, but they are said to represent a fair average, and include all factors entering into a commercial operation except taxes. Briefly, it may be recalled that Mr. Jefferies' process involves the liquefaction of air by compression and expansion, and then distilling off the nitrogen, just as is now done by the Linde and other processes; but instead of consuming large amounts of power to drive compressors and then throwing practically all the work away by free expansion in the still, the new method is based on the simple idea of carrying on the distillation under pressure, that is at the pressure to which the air is originally compressed. By this means the nitrogen, or most of it, which is 80 per cent. of the whole volume of the air, leaves the still under the original pressure. It then can be heated to increase its volume and power capacity, and used in a piston engine to drive the compressor. For this purpose very little heat is demanded for the performance of a great deal of work, for the efficiency of conversion of heat put into a gas already under pressure is about 75 per cent., whereas only about 15 per cent. of the heat put into raising steam is converted into work.

By these simple means, which—as Mr. Jefferies puts it—only involve the mixture of a little common sense with established facts and sound engineering, a method has been evolved which requires no external power to operate, but uses instead a comparatively small amount of fuel. Nature imposes only a small resistance to the separation of a mixture of gases—in fact only about 3 H.P. is required theoretically to separate 1,000 ft. of oxygen per hour from the atmosphere—and the new method, when applied on a large scale, works at about 60 per cent. efficiency, which is ten times as efficient as current practice. The combined effect of these two favourable factors, viz., high process efficiency and that the small amount of power required can be supplied by heat instead of requiring the use of external power, results in the ability to produce oxygen at so low a cost.

The Lesson of "Synthetic" Gold

STARTLING as the statement is that a German chemist has succeeded in producing "synthetic" gold out of baser metals by means of the electric vacuum furnace, no one has attempted to ridicule or to discredit it. The attitude of British chemical authorities is one simply of reserve. The statement that gold has actually been "synthetically" produced remains to be proved, but the possibility of this or of any other discovery would hardly be questioned by men who spend their lives on the verge of nature's secrets, and sometimes live to see the veil removed. For the idea that all things are possible falls as easily within the boundaries of science as it does within the realm of faith.

If the claim is substantiated and the process developed on a commercial scale, there will, of course, be widespread economic disturbance and complication. These collateral, and in any case remote, consequences may for the moment be excluded from consideration. The subject is mentioned here for quite another reason. That is, to remind those responsible for chemical research in this country that Germany during the war, and since, has not stood still, and that comparisons with her pre-war position may be utterly deceptive. It is common to measure our achievements by reference to such matters as poison gas and dyestuffs, and to point out our excellence in the one case and our rapid recovery of lost ground in the other. But these standards may be fast becoming obsolete, and the announcement just made respecting synthetic gold warns us that Germany may be already breaking new ground. The people who solved on a commercial stage the problem of the fixation of atmospheric nitrogen—however sinister their aims and motives may have been—are capable of equally great triumphs in other directions.

Authorities who have made personal inquiries into the matter assure us that presently much may be heard of advances in agricultural science in Germany. It is said that processes have been developed of so treating seed as both to protect it from pests and disease and enormously to increase its vigour. The idea, in short, has been by new chemical processes of fertilisation to impregnate the seed with the energy which has hitherto been applied externally at later stages of growth. How far this is true we are not in a position to say, but it is confidently asserted that as the result of experiments, seed so treated is rendered far more immune from disease and pests, that the plant life is fed with far greater effect and becomes proportionately more vigorous, and that the yield is largely increased. All this, like the story of synthetic gold, has to be proved in practice, but it is enough to convince us that German research chemists, instead of resting content with past achievements, are working for further advances and eagerly searching after new starting points. The moral for this country is too obvious to require to be put into words.

"Credulo-Chemistry"

OUR American friends, who have recently coined this new and expressive term, have also supplied what seems to us suspiciously like a perfect example of it. With the utmost gravity—real or simulated it is impossible to say—a United States contemporary publishes a communication from Professor Sherlock Schultz, Ph.D., Knight of the Prussian Eagle (3rd class), announcing the production of complete series of new German dyes, for which import licences have been granted in the United States. In the Double Header series, which are said to be in demand among American users, Bronzebrown 207D and 210G are "used by life-savers at the Jersey Coast resorts to produce that manly tan so much admired by all." Steel Blue 60A, again, is "widely employed by stocking-knitters in New England and Prohibition centres"—which suggests that the "blue-stocking" type of woman student is not confined to this country. A yet more remarkable colour is Sky Blue B—"it has no American-made substitute for colouring reports on commercial bribery to the Federal Trade Commission." What is described as "a most interesting new series" is the 9-99 group, "so-called after the old Empire State Express train, because of their extreme fastness." Of these groups certain colours have been licensed in quantities "sufficient for the needs of the great American lip-stick and rouge industries for the next three months." After learning that certain Garnet Lake numbers "are new dyes of the alpha-beta-gamma naphthylamine group, diazotised by the

exacting red pepper method," we are warned that Leather Colour 156, which is a new dye used to colour leather, as the intelligent reader might infer for himself, " must not be confused with 155, used by the chewing gum manufacturers because of its lasting qualities, or with 157, which finds employment in the arts in tinting the lilies of the field."

What we especially like in this priceless piece of fooling is the contrast of the polished satire and good English found in one sentence with the ponderous German idiom of the " hunt-for-the-verb " style in another. Professor Sherlock Schultz, Ph.D., Knight of the Prussian Eagle (3rd class), is not known to us by person or reputation, but we should say that this performance entitles him to promotion to quite the first class of German leg-pullers.

Employment in Lead Processes

THE Home Secretary has issued three orders in pursuance of the Women and Young Persons (Employment in Lead Processes) Act (*a*) declaring what is a lead compound for the purposes of the Act, and prescribing the method of ascertaining whether any compound is a lead compound within the definition, (*b*) prescribing the periodic medical examinations required, and (*c*) prescribing cloakroom, messroom, and washing accommodation. According to the first order (No. 1713) the expression " lead compound " means any compound of lead other than galena, which, when treated as prescribed, yields to an aqueous solution of hydrochloric acid, a quantity of a soluble lead compound exceeding, when calculated as lead monoxide, 5 per cent. of the dry weight of the portion taken for analysis. Under the provisions of section 6 the expression " lead compound " also includes any mixture containing any such compound (as defined in the Order), but does not include an alloy containing lead. The method of treatment prescribed is as follows :—

A weighed quantity of the material which has been dried at 100° C. and thoroughly mixed is to be continuously shaken for one hour, at the common temperature, with 1,000 times its weight of an aqueous solution of hydrochloric acid containing 0.25 per cent. by weight of hydrogen chloride. This solution is thereafter to be allowed to stand for one hour and then filtered. The lead salt contained in the clear filtrate is then to be precipitated as lead sulphide and weighed as lead sulphate.

The second order (No. 1714) provides that all women and young persons employed in a lead process shall be examined by the certifying surgeon for the district appointed under the Factory and Workshop Act once in every three months. The third order (No. 1715) requires the occupier to provide and maintain for the use of all women and young persons employed in a lead process suitable accommodation for clothing put off during working hours, and suitable and adequate arrangements for taking their meals on the premises during meal intervals.

A Bibliography of Science

THE announcement by the conjoint Board of Scientific Studies of a scheme for the publication of a list of all the periodicals in every country which publish the results of scientific research is one of great interest to students. There are many thousands of such publications, and it is intended to indicate some of the chief centres in Great Britain and Ireland where they may be consulted. The Trustees of the British Museum have consented to allow the work of compilation to be undertaken by their staff. The list, a two guineas octavo volume, will contain, in alphabetical order, the titles and places of publication of all such periodicals in existence on January 1, 1900, and of all issued after that date. Libraries in London, Oxford, Cambridge, Edinburgh, Dublin, and Aberystwyth which take in these periodicals will be named in the list, and, wherever possible, at least one library in the United Kingdom will be indicated for each title. Copies will be printed on one side only to facilitate alterations and additions. One of the objects of the proposed volume is to form a basis for co-operation between libraries, so that both the number of duplicates and the list of periodicals not taken in may be reduced. The cost, of course, will be heavy. If, however, a sufficient number of libraries and institutions agree in advance to purchase one or more copies when issued, the compilation of the list will be put in hand at once.

Points from Our News Pages

Further evidence at the resumed Calcium Carbide inquiry was given by Mr. Ballantyne, Dr. W. H. Perkin, Professor G. T. Morgan, Professor Hewitt, and others (p. 792).

In view of doubts raised by the Customs authorities the Referee has slightly amended the terms of his decision in the recent Gas Mantles inquiry (p. 794).

The inquiry into the protection of British glassware against foreign " dumping " was resumed on Tuesday and adjourned until January 3 (p. 791).

As the result of the Referee's decision in the recent inquiry, santonine has been withdrawn from the Board of Trade List as from December 20 (p. 791).

Revised prices of sulphate of ammonia for the 1921-22 season are issued by the British Sulphate of Ammonia Federation (p. 797).

A new method of preparing gluconic acid was described at Birmingham by Professor A. R. Ling and Mr. D. R. Nanji (p. 796).

Results of experiments on the suitability of certain methods of estimating carbon dioxide in mineral carbonates were given at Newcastle-on-Tyne last week (p. 795).

The death is announced of Mr. H. Oertling, governing director of L. Oertling, Ltd. (p. 794).

The demand for chemicals, for the time of year, is reported to be fairly satisfactory, but orders, although fairly numerous, are generally on the small side (p. 804).

Books Received

SYNTHETIC TANNINS. By Georg Grasser. Translated by F. G. A. Enna. London : Crosby Lockwood & Son. Pp. 143. 12s. net.

APPLIED CALCULUS. By F. F. P. Bisacre. London : Blackie & Son. Pp. 446. 10s. 6d. net.

ANALYTICAL CHEMISTRY. Based on the German of F. P. Treadwell, Ph.D. ; translated and revised by W. T. Hall, S.B. Volume I. : Qualitative Analysis. New York : John Wiley & Sons ; London : Chapman & Hall. Pp. 597. 23s. net.

ORGANIC SYNTHESES. Volume I. By Roger Adams. New York : John Wiley & Sons ; London : Chapman & Hall. Pp. 84. 8s. 6d. net.

INDUSTRIAL HYDROGEN. By Hugh S. Taylor, D.Sc. New York : The Chemical Catalog Company. Pp. 210. $3.50 net.

BREWING AND MALTING. By J. Ross Mackenzie. London : Sir Isaac Pitman & Sons. Pp. 143. 8s. 6d. net.

CONVERTING A BUSINESS INTO A PRIVATE COMPANY. By Herbert W. Jordan. London : Jordan & Sons, Ltd. Pp. 48.

Sterilisation of Water Supplies

During a varied experience of new water supplies at a number of factories the writer has had occasion to make a study of the application of suitable sterilisation methods which he describes below.

AGENTS for sterilising purposes have only come into general use during recent years. This is probably an indirect consequence of the growth of large masses of population round industrial areas. Under these conditions some pollution of water supplies is almost inevitable, and municipal authorities have had occasion to revert to treatment and sterilisation of the water when obtained locally. To overcome this difficulty a number of the large cities have sought the source, collection, and storage for their water supplies well out in the country, and usually at a considerable distance from the town itself, which entails a large expense as initial outlay and upkeep.

The following is a list of sterilising methods that may be employed on a large scale :

Treatment by means of coagulants and storage.
Coagulation and sand filtration, either under pressure or gravitation.
STERILISATION by means of (*a*) bleaching powder, (*b*) sodium hypochlorite, (*c*) liquid chlorine.
Ozone treatment.
Treatment by means of ultra violet light rays.
Direct destruction of bacteria by means of chemical germicides.

Treatment by Means of Coagulants

The chemicals generally used as coagulants are lime and ferrous or aluminium sulphate. The principle involved is double decomposition with precipitation of two insoluble salts, forming with the silt and bacteria a colloidal net of fine particles, which entangles and carries down the micro-organisms. Incidentally this treatment clarifies the water of any organic colouring matter.

The outstanding objection to this method of sterilisation is that, to render pathogenic germs innocuous, lengthened storage is necessary after treatment. Also, it is obviously essential that the water should be drawn away without any agitation. With respect to the latter, many difficulties present themselves when large volumes of water are involved. The weather conditions are also important factors. Storage alone creates a marked diminution in the number of bacteria. This phenomenon is due to :

Subsidence.
Antagonism of other organisms, leading to a struggle for existence.
Light—most bacteria are quite incapable of resisting direct sunlight.
Food supply to be found at bottom.
Toxic waste products of bacteria may render water incapable of supporting bacterial life.
Influence of osmotic pressure.

Coagulation and Sand Filtration

Coagulation is carried out as described above ; but the water is filtered through a sandbed about 3 ft. deep, the precipitate forming a gelatinous membrane. A newly-precipitated membrane is a much more efficient bacterial filter than one that has been standing for some time. High pressure filters have a decided advantage over gravitation filters from a utility standpoint, and are also more effective and economical. According to Johnson, Osaka, Japan, gravitation sand filters were in use for filtering the water of the Joda River in 1905. The results given were as follows :

Before filtration	200	bacteria per c.c.
After ,,	25	,, ,, ,,

At Bethmangala, India, 1906, high pressure mechanical filters were in use, filtering the Palar River water :

Before filtration	4,350	bacteria per c.c.
After ,,	13	,, ,, ,,

The author has had experience of a battery of 24 high pressure filters (Mather and Platt design), which dealt very effectively with 3,000,000 gallons of water per 24 hours.

Sterilisation with Bleaching Powder

The commercial product generally contains about 35 per cent. of chlorine, which is capable of conversion into hypochlorous acid. The principle of the use of bleaching powder as a sterilising agent is that the hypochlorous acid, being unstable, readily decomposes in the presence of carbon dioxide evolving nascent oxygen, which has very powerful germicidal properties. Any objectionable taste is quickly removed on exposure to sunlight. Moor and Hewlett (1909-1910) have shown that one part chlorine per 1,000,000 parts of water is sufficient to destroy all Bacillus Coli in thirty minutes.

Sterilisation with Sodium Hypochlorite

A solution of sodium hypochlorite is quickly and economically made by either the electrolysis of sea-water, or the action of chlorine on a solution of caustic soda. The germicidal action is similar to that described above, but does not occasion the presence of carbon dioxide. Sodium hypochlorite is advantageous in that it is a soluble salt, and is one of the best sterilising agents, providing the organic matter is small, and the solution freshly made.

Sterilisation with Liquid Chlorine

Nessfield (*J. Prev. Med.* XIII., 1905, p. 623) recommends the use of liquid chlorine for sterilising large bulks of water. Together with being inconvenient and expensive, dry chlorine has no advantage over hypochlorites, and it is also open to question whether it is as effective.

Ozone Treatment

Ozone is a most effective agent for destroying micro-organisms. This treatment has been successfully utilised in a few isolated cases for sterilising town water supplies in France. The ozone is usually prepared near the water-works, advantage being taken of cheap water power for the production of high tension electric currents. The treatment necessary for producing ozone can be economically applied only where the organic matter is low, as this latter appears to have a deleterious effect on the sterilising properties of ozone.

Ultra Violet Light Treatment

The principle involved is that the ultra violet rays, emitted from a quartz mercury arc lamp, possess powerful germicidal properties. This appears to be a parallel case to that of chemical action induced by optical absorption. This method as yet is in its infancy, but shows promise of wide application. The lamp is so arranged that the rays are emitted at the centre of a pipe through which the water passes. By this means the whole of the water is brought within the effective zone. The writer is informed that the Marseilles water supply is now sterilised by this method.

Chemical Germicides

The following are the principal chemicals employed : Sodium bisulphate, potassium permanganate, iodine, copper, copper sulphate.

None but the last two has been used on an extended scale. It is claimed that water high in carbonates is capable of dissolving sufficient metal from bright copper to destroy typhoid and cholera germs in twenty-four hours. This is evidently due to the action of the salts formed. Copper sulphate one part in 100,000 parts of water is similarly effective. One part copper sulphate in 1,000,000 parts of water destroys green algæ ; this device is often used in lakes and

waterworks where algæ are prevalent, the usual means adopted being to tow a bag of copper sulphate through the water until dissolved.

In deciding upon the best means to be adopted for the sterilisation of a particular water supply, the cost varies considerably according to the hardness of the water. Sterilisation by means of chemicals appears to suffer from a popular prejudice. This method should only be adopted when controlled by expert supervision. The adoption of ozonisation or ultra violet rays as a general means of sterilisation of water supplies has still to be established, and could only be considered where there is an economical supply of power available.

Safeguarding British Glassware

Resumed Inquiry into Makers' Complaints

THE hearing of evidence by the Committee appointed by the Board of Trade to consider applications under Part II. (Prevention of Dumping) of the Safeguarding of Industries Act, in connexion with British Glassware, was resumed on Tuesday, December 20, when evidence was given on behalf of Webb's Crystal Glass Co.

The Chairman (Sir William Ashley) announced that the original complainants had postponed that portion of their complaint which related to mounting glass, after a conference with the Birmingham Jewel Association, who had given notice that they would oppose the application. Webb's Crystal Glass Co., however, who desired to give evidence in support of the original complaint, had now given the Committee notice that they desired to maintain the complaint so far as mounting glass was concerned. It would be for the convenience of all concerned, and would expedite matters, if the Committee received evidence from Webb's Crystal Glass Co. under that head, as under the other two heads, giving immediate notice, of course, to the Birmingham and Sheffield Silversmiths' Association that they were doing so.

MR. S. N. JENKINSON (managing director of Webb's Crystal Glass Co.) then gave evidence, a summary of which had been handed to the Committee, and certain parts of which the company desired should be treated confidentially.

THE CHAIRMAN pointed out that it was very desirable that as much of the evidence as possible should be made public, and that it was not desirable that parts of the evidence should be withdrawn from publicity unless it was really of great business importance that they should be treated confidentially.

MR. JENKINSON said that the evidence had been considered by this Board, who were particularly anxious that information with regard to costs should be kept confidential. He saw no objection, however, to the prices of foreign wares compared with similar British wares being published, provided that no names were mentioned. Webb's Glass Co. were not only manufacturers, but merchants and importers of table, mounting and illuminating glass. The company was recently formed, and had taken over businesses dating back to about 1760, on the merchanting side, and to about 1850 or 1860 on the manufacturing side.

With regard to materials and plant used in the manufacture of glass, before the war this country was dependent upon Belgian and French sand, but, owing to improvements in the sand-washing and grading plant installed in sandpits here, Webb's Co. used all British sand. The principal countries importing the glassware in question were Germany and Czecho-Slovakia. The exchanges in those countries were very much depreciated, and in regard to raw materials that was an advantage, because all their raw materials were in their own countries, and the external variations of the exchange did not affect them. If the glass industry in this country were protected, and could increase its activities, it would increase employment in other industries owing to the use of British raw materials; over 50 per cent. of glass was sand. Before the war the best quality of sand came from France, and a slightly inferior quality from Belgium, but during the war British sand resources were developed, and pressure brought to bear upon the sand people in this country resulted in their installing proper plant for the washing and grading of sand.

Dealing with the improvements effected with regard to refractories, Mr. Jenkinson said that his firm had done a considerable amount of research work. One of their factories had been doing experimental work for some time, and they also had a central research department working on refractories.

Comparing British and foreign prices of various types of glassware, the evidence was that wineglasses which were offered by foreign manufacturers at 3s. per dozen were costing 9s. per dozen to produce here. The foreign offer was in June last, whilst the calculation as to home production costs was of more recent date, but the costs were very similar to those obtaining in June. Claret glasses were imported at 3s. 2½d. per dozen, as against the British price of 11s. 9½d.; an order was placed at a similar price in November. Foreign rich cut marmalade glasses and covers (August) were 37s. 6d. per dozen, as against the British price of £9 12s. per dozen; on December 2 an order was placed at one-sixth less. Rich cut biscuit glasses, £5 6s. 3d. per dozen (September), as against production costs here, £17 14s. Half-pint tumblers for stamping (thin), 4s. 8½d. per 100, plus 10 per cent. (October), as against 7s. per dozen; soda tumblers, three-quarter pint, foreign price, 8s. 1d. per 100; British costs 9s. per dozen; other prices of foreign glass were given as follows: 8-in. opal hemispheres, 1s. 6d. per dozen; 8-inch opal cased hemispheres, 1s. 11d. per dozen; duplex chimneys, 5s. 11d. per 100; 9-in. opal conical shades, 15s. 4d. per gross.

In 1913 casual orders were in vogue in British glassworks, whilst continental works were able to deal with bulk orders for which plant was not available here. During the war, however, modern furnaces were built and plant installed, but labour was not available. In 1920 labour was available, but at that time the continental works began to export to this country, just when the industry here was able to deal with bulk orders in an efficient manner, with the result that much of the plant could not be utilised, nor the labour employed.

With regard to the numbers employed in Messrs. Webb's works, the witness would not give actual figures, but percentages. At the Stourbridge works (which produced table glass) they employed about 25 per cent. less than during the busiest period in 1920; at the Tudbury works (producing illuminating glass), 40 per cent. less; at Edinburgh (mounting glass), 43 per cent. less; and at Queenborough (illuminating and table glass) the works were shut down. In the first quarter of 1921 the total number employed was 723, and those employed at the present time numbered 411.

Replying to Sir T. W. Allen, witness said British costs of production were, roughly, double what they were in pre-war days; the price of the German goods, in sterling, was about half the pre-war price.

SIR T. W. ALLEN asked if an addition of 33⅓ to the price of imported goods would affect the British industry very much, having regard to the fact that British costs of production were from 300 to 700 per cent. higher than the prices of the goods imported.

MR. JENKINSON said his opinion was that the imposition of a 33⅓ per cent. duty would certainly increase production in this country, because it would increase sales; overhead charges would come down with increased production. At the same time, the production by continental factories would decrease, and overhead charges thereby increase, so that the actual effect of the duty would be greater than the duty itself.

SIR JOHN BARRAN, referring to the double interest of Webb's Crystal Glass Co., namely, merchanting and manufacturing, and the effect of one upon the other, asked a number of questions with regard to importing.

MR. JENKINSON said that only recently had the two interests been merged. He would not regard the imposition of a tax on imported products as having a damaging effect upon the business, because it would help them on the manufacturing side. They did buy articles from abroad which were similar to those they themselves manufactured, and no objections had been raised by foreign firms from whom they had bought.

THE CHAIRMAN announced, at the close, that, owing to the illness or withdrawal of witnesses, there would be no further public sittings until January 3.

Santonine Duty Withdrawn

THE Board of Trade announce that the Referee, after hearing a complaint under the Safeguarding of Industries Act, that santonine had been improperly included in the lists of articles chargeable with duty under Part I. of the Act, has given a judgment upholding the complaint, and accordingly santonine is withdrawn from the lists as from December 20.

Safeguarding of Industries Act

Expert Evidence in the Calcium Carbide Inquiry

THE inquiry before Mr. Cyril Atkinson, K.C., the Referee under Part I. of the Safeguarding of Industries Act with regard to the application of the British Cellulose and Chemical Manufacturing Co. to have calcium carbide included in the list of articles to be taxed, was continued on Saturday, December 17.

Mr. H. Ballantyne

MR. H. BALLANTYNE, the first witness for the complainants, was further cross-examined by Mr. Hogg on behalf of Swedish manufacturers.

Asked by Mr. Hogg whether he was an organic or inorganic chemist, Mr. Ballantyne said he did not think he was either, or perhaps he might claim to be both. He regarded a chemist at a carbide manufacturing works simply as a chemist, just as he would a chemist in an iron or steel works.

Dealing with his own definition of a chemical given at the last hearing, Mr. Ballantyne said it was not so much a definition as a description, and he preferred the definition given by the Referee in the santonine case. He did not regard calcium carbide as a fine chemical.

Questions were then put as to the necessity for cheap power. Mr. Ballantyne said it was equally possible to obtain cheap power by water or by coal.

MR. HOGG: Do you tell the Referee that the production of electricity by means of coal can ever compete with the production of electricity by means of water.

MR. BALLANTYNE replied in the affirmative. He had been looking about for water-power himself, and it was necessary to take into consideration not only the actual power but the cost of the works necessary to make use of the water as well as the carriage of the materials for the process to and from the place where the water was. In England we could get cheap coal at the coalfields and any extra cost of power would be compensated for by the savings in carriage of materials. It would be more profitable to manufacture in England with coal than abroad with water power.

THE REFEREE: Then why don't they?

MR. BALLANTYNE said the carbide was coming in too cheaply from Norway, Sweden and Canada. He did not know, however, the comparative cost of power abroad and here at the present moment.

MR. TREVORS WATSON then subjected Mr. Ballantyne to a long cross-examination on behalf of the Board of Trade. Questions were put with the object of showing that the classification of chemicals into organic and inorganic, although of importance when it was first made, is now of no practical importance.

MR. BALLANTYNE would not agree. The classification remained important because it enabled them to divide chemicals into manageable proportions for practical purposes as well as for teaching. Young students always took inorganic chemistry first, and it might be that the examination papers included calcuim carbide as an organic substance, but it was merely a matter of convenience.

MR. WATSON referred to the Institute of Chemistry's examinations which included calcium carbide as an inorganic substance and he contended that the Institute had given its cachet to that classification.

MR. BALLANTYNE said he would not call any substance organic unless it contained carbon, and calcium carbide did. He excluded carbonates because they were regarded as mineral substances, and, in fact, were mineral substances, and were also regarded as inorganic substances. Most carbides he regarded as organic, although from a practical standpoint he only knew of two carbides that he could handle, viz., silicon carbide and calcium carbide. Such things as carbides of iron, for instance, were known to exist but they could not be handled.

Reference was made to the report of the Nitrogen Products Committee, which stated that before the war three times as much carbide was used for the manufacture of cyanamide and ammonia as for acetylene. Mr. Watson made the point that it was spoken of in the report as being valuable because of the nitrogen content, and not the carbon content.

MR. BALLANTYNE said that emphasised his point because it was by virtue of the reactivity of the carbon that all these other compounds were obtained.

THE REFEREE said he understood the position taken up by the opposition was that there was no definition of an organic chemical and that whether a substance was or was not an organic chemical must be decided by certain tests on each individual substance.

SIR DUNCAN KERLY said he had no great objection to state what his position was. He suggested that there were seven tests which must be applied to every substance to ascertain whether it was organic or inorganic, viz.: (1) a solid when heated to under 300° undergoes change and generally chars or sublimes or melts; (2) organic compounds are unstable; (3) they are soluble in appropriate solvents; (4) they are classifiable in chains or rings; (5) organic compounds are generally not hard or ricky; (6) they are dealt with in the organic parts of books on chemistry; (7) they are dealt with by organic chemists.

MR. BALLANTYNE was then taken through the series of tests and disagreed with them as being necessary to determine whether a substance is organic or inorganic. He preferred the simple definition he had already given.

Answering questions by the Referee, Mr. Ballantyne said he would not take the expression "synthetic organic chemicals" in the schedule in its academic sense. He could not help feeling that there was a practical side to the matter. He felt that although a body might be an organic compound. there might still be some reason, such as applied to the carbonates, which would take it outside for practical purposes. He could not understand there being any difference of opinion about calcium carbide, however, because it was a substance in which the carbon was extremely active.

THE REFEREE: Even so, it is a matter of opinion?

MR. BALLANTYNE: All these things are matters of opinion.

THE REFEREE said that half-a-dozen people were coming on the other side to say that in their opinion calcium carbide was not an organic substance, and he wanted a definition which would settle it.

MR. BALLANTYNE said in that case he thought the best test was the scientific definition unless there was some generally accepted reason for acting otherwise. In the case of calcium, there was no reason for taking it out of the list of organic substances that he knew of.

A Norwegian Witness

At this point, MR. IVOR HOY, a witness on behalf of the Norwegian manufacturers, in opposition to the application was heard, as he had to go back to Norway. Mr. Hoy said he was managing director of the Meraker and Hafslund calcium carbide factories at Koperaan, Norway, the capacity of which was 18,000 tons and 40,000 tons per annum. Electric furnaces were used, the power employed being from 2,000 to 20,000 H.P., generation being by water-power. The anthracite required for the process and the lime were placed into the furnaces and were smelted, the carbide being tapped off at regular intervals, It was then taken to the cooling room, and after cooling it was crushed in a stone-breaking machine. It was then packed in tin drums for the market. The process was continuous, and once the furnace was started working no control was necessary. An ordinary workman attended to the furnace, and there was one chemist at each works, but he did not ask, when engaging his chemists, whether they were organic or inorganic. The gas yield was tested by boys who were not trained chemically. His case was that it was necessary to have cheap power to produce calcium carbide, and whereas he understood that the cost per H.P.-year in this country for the purpose would be about £10, it was only £1 to £2 in Norway. The cost of power per ton of carbide would be £1 10s. in Norway as against about £6 in England, using coal. The anthracite used in the process was obtained from South Wales, as were the tin plates for packing. The effect of a tax on imported carbide would mean that the price in this country would have to be increased to the extent of the duty, whilst on the other hand, we in this country were not in the position of developing the industry because of lack of cheap power. If the carbide did not come from Norway it would come in from Canada on about the same terms, because the conditions as to water power were very similar. In that case we should lose the market for anthracite.

Dr. W. H. Perkin

When evidence was resumed for the complainants, DR. W. H. PERKIN, Professor of Chemistry at Oxford since 1892, supported the views already put forward by Mr. Ballantyne. He said he objected to any distinction being drawn between chemists in the direction of classing them as organic or inorganic. A chemist was a chemist, in his opinion, and because a man happened to give special attention to one branch he should not be labelled as belonging to that branch only. He did not accept the view that had been put forward on the other side, that a synthetic chemical was the reproduction in the laboratory of a substance previously found in nature. There was a whole range of dyestuffs which were made synthetically but were not found in nature.

The inquiry then adjourned until Tuesday, December 20, when the examination of Dr. Perkin was resumed.

Questioned by Sir Duncan Kerly, the witness stated that substances which were admittedly organic substances were frequently included in works on inorganic chemistry for the sake of convenience.

SIR DUNCAN KERLY asked the witness if he knew of any solid organic substance which, when heated to a red heat, about 500 or 550°, would still exist as a solid organic substance, apart from the carbides.

THE WITNESS replied that he could not. There were, however, organic substances which would remain organic substances at red heat, though not in the solid form, such as anthracene. This was always a solid under ordinary circumstances, but at red heat it would distil; when it vaporised, however, it was still anthracene. He admitted that it would be unusual to hear of a solid red-hot organic compound.

COUNSEL asked why the witness had said that calcium carbide was a manufactured product.

PROFESSOR PERKIN said that it was a derivative of acetylene, which was a manufactured product.

THE REFEREE said that acetylene was a derivative of calcium carbide; could it be said that calcium carbide was a derivative of acetylene?

PROFESSOR PERKIN said that was so.

SIR DUNCAN KERLY pointed out that calcium could also be prepared from CO_2, in which case it could be described as a derivative of CO_2.

PROFESSOR PERKIN said they could make every organic compound from CO_2, indirectly. He had been told that metallic calcium, treated with CO_2, would give calcium carbide. Before calcium carbide could be made from CO_2 it must be reduced to carbon, so that calcium carbide was a derivative of carbon.

SIR DUNCAN KERLY then put a number of questions with regard to the training of chemists, and asked whether there was any distinction between that of an organic chemist and an inorganic chemist.

PROFESSOR PERKIN said that the training was the same until a chemist had taken his degree. There was no reason to distinguish between an organic and an inorganic chemist. If a company were setting up a carbide works, and wanted a chemist, he would not recommend an organic or an inorganic chemist, but an ordinary chemist.

MR. DOUGLAS HOGG, cross-examining, asked the witness what was his use of the term "derivative." He had said that a thing was a derivative of another if it could be made from that other.

PROFESSOR PERKIN said broadly that was true. A substance was a derivative of another, whether it were made directly or indirectly from it.

MR. HOGG asked why water was not a derivative of acetylene, when it could be made from acetylene.

PROFESSOR PERKIN said the reason was that in order to make water they must first destroy the acetylene.

Asked to state a test to determine whether a substance was a derivative of another or not, the witness said that broadly it was a question of whether they could get back to the original substance.

In answer to a further question, the witness said that when adding calcium carbide to water they were adding the essential part of the acetylene to the water. The two carbons joined together were the essential part. The two carbon atoms were more essential than the two hydrogen atoms, because the latter might belong to many other substances, which was not the case with the two carbon atoms joined together. As examples of what were and what were not derivatives, the witness said that if the sodium in acetic acid were dissolved they would get sodium acetate. That was a derivative of acetic acid, because they could get acetic acid back again from it. On the other hand, if they burned benzene they would get carbonic acid and water, which were not derivatives of benzene because they could not get benzene back again from them. The word "derivative" implied the reciprocal idea.

Answering questions as to the meaning of the word "organic," witness said he did not think it possible to have a more precise definition than the carbon compound definition.

Professor G. T. Morgan

PROFESSOR G. T. MORGAN (Professor of Applied Chemistry, University of Birmingham) next gave evidence for the complainants, and included in his definition of organic chemicals any compound of carbon. In his opinion, the word derivative was one essentially concerned with structure, and he would say that calcium carbide was a derivative of carbon, because it had a molecular structure.

Dealing with the inclusion of calcium carbide in an inorganic chemistry, that depended upon the point of view from which the writers of those books approached the subject. Calcium carbide was the parent of calcium and carbide, and if the writers of books were more interested in calcium compounds they would put calcium carbide amongst them, and if they were more interested in the organic side, they would put it among the carbon compounds. The witness agreed with Sir Arthur Colefax that the first time Moissan's discovery of calcium carbide was published in English it was included in the Chemical Society's Journal among the organic compounds; he believed that was in 1894. The witness did not know any definition of the word "organic" which would exclude calcium carbide.

With regard to Sir Duncan Kerly's suggestion, namely, of heating to a red-hot temperature, the witness said there were quite a number of organic compounds which would withstand a test of 500 or 550°. Heating with cupric oxide was a very good test for organic substances.

THE REFEREE said that was because they were able to ascertain whether carbon was there.

THE WITNESS agreed.

MR. DOUGLAS HOGG, cross-examining, said it was claimed that calcium carbide must be treated as a derivative of hydrocarbons, because hydrocarbons were obtained from it. That showed that it was a source of hydrocarbons, rather than a derivative.

The WITNESS said it was a source and a derivative.

Professor Hewitt

PROFESSOR HEWITT, F.R.S. (Examiner in Chemistry at Cambridge, London, Sheffield, &c., and formerly Professor of Chemistry in the University of London), gave evidence, and maintained that calcium carbide was a synthetic organic body. With regard to the word "synthetic," he agreed with Counsel that if it could be properly applied to dyestuffs and colouring matters, as we know them (which were derivatives of calcium), he could not possibly appreciate why it was not applicable to calcium carbide.

The inquiry adjourned until Wednesday.

Nobel Industries, Ltd.

On Wednesday MR. JOHN ROGERS, of Nobel Industries, Ltd., and in charge of the firm's explosive and chemical works, supported the views expressed by the previous witness as to calcium carbide being an organic substance.

Mr. M. B. Dickie

The next witness was MR. M. B. DICKIE, general manager of the British Cellulose and Chemical Manufacturing Co., whose works are at Spondon, Derby, and have cost £3,700,000, of which £600,000 is represented by the carbide works, which were erected at the request of the Government, and have a capacity of 120 tons per day. Their maximum output has been 65 tons per day, but the average is 30 tons per day.

Answering the Referee as to why and when the works were closed, Mr. Dickie said they were closed in 1920 in consequence of the high cost of labour and materials, making the price so high that they could not compete with imported carbide. During 1920 the price which was being realised was £26 per ton, but when Austrian carbide began to come into the country at £17 per ton, then they found it impossible to compete, and the works were closed, because even at the time when the price was £26 per ton the actual cost in

England was £33, to which a further one-fifth would have to be added to cover overhead charges and profit, making something like £40 in all. To-day's average prices for Norwegian, Swiss, and Swedish carbide were from £14 to £16, but production had been stopped in all these countries, and they were only selling stocks. The point was that no country in the world could now manufacture carbide to compete with Germany, Austria, and Czecho-Slovakia because of the exchange.

The REFEREE put a number of questions, and was told that the present estimated cost of manufacture in this country would be very much lower than that in 1920, because of the fall in the cost of labour and materials.

THE REFEREE: Why cannot you produce so cheaply as imported carbide?

THE WITNESS: I think we can.

THE REFEREE: Then why do you need help?

THE WITNESS said in the first place they were entitled to have a key industry established in this country, and also, as the Government insisted upon the company putting down the carbide works and contributed nothing towards them, he felt the company were entitled to help which would enable them to spread the charges over the very large factories which they had, covering some 200 acres, and at the same time give more employment.

THE REFEREE said he had power, under the rules made by the Board of Trade, to order that the inquiry should be held in private when he thought necessary, and he would do so whilst prices and costs were discussed.

Mr. S. E. Artiss

MR. S. E. ARTISS, Secretary to British Carbide Factories, Ltd., explained that his company was formed in 1907, and built works at Thornhill, in Yorkshire, but removed them in 1916, at the request of the Government, to Manchester. They had cost £40,000, but were shut down at the time of the coal strike, and had not been reopened since. The price of carbide was £23 per ton when his works were closed down.

The next sitting will be held on January 14, and, according to arrangements, will not be open either to the public or to the Press.

Referee's Decision on Gas Mantles

Point Raised by Customs Authorities

THE Customs Authorities have raised a doubt as to the exact meaning of the decision of Mr. Cyril Atkinson, K.C., in regard to the taxation of imported gas mantles under Part I. of the Safeguarding of Industries Act, and before the consideration of the calcium carbide case was resumed on Wednesday a long argument took place with regard to the point.

In the decision (already reported in THE CHEMICAL AGE) the referee ordered that certain words should be added to the list of goods issued by the Board of Trade, which include already thorium and cerium as separate articles. The words ordered to be added were: "Mechanical compounds of nitrates of thorium and cerium and of oxides of thorium and cerium in the form of mantles or forming part of mantles used in incandescent gas lighting." The Customs authorities suggest there is an ambiguity there, and they are in doubt as to whether the referee means that the compound of thorium and cerium is only taxable in its raw state before any work is put into it to make it usable in a mantle, or that the value of the compound is that after the labour has been put into it to make it suitable for use in the mantle, which admittedly would very largely add to the cost and, consequently, the tax.

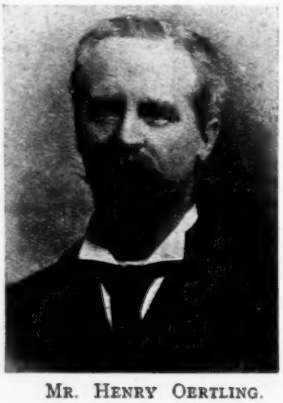
The referee said he had definitely stated in the decision that he did not determine the manner in which the tax was to be determined, and he left that to be settled under section 1 (4) of the Act, which provides for disputes on that account to go before an arbitrator who was not himself. The Customs apparently took the view that what was taxable was merely the raw materials before any work was put upon them, but he wished it to be clearly understood that he expressed no opinion upon that point. To clear the matter up, as far as he was concerned, he proposed to alter the words to be added to the list to the following: "Mechanical compounds of nitrates of thorium and cerium and of oxides of thorium and cerium, being ingredients of forming part of mantles used for incandescent gas lighting."

After argument the referee added that he did not think anyone hearing the judgment could have formed the opinion that he had meant the whole of the mantle to be taxed. He desired to leave the form in which the tax was to be levied entirely open, and all he had decided was that mechanical compounds of thorium and cerium should be added to the list as distinct from the separate items. If anyone had a further suggestion to make he would be pleased to consider it in order to make his intention perfectly clear, and he left it open to Mr. Terrell to ask him to state a case for the opinion of the court if he desired to do so.

Finally, it was agreed that Mr. Terrell should communicate with the referee after considering the matter with a view to arriving at words which would meet the case, both Mr. Terrell and Mr. Gray agreeing that they wished the point as to how the thorium and cerium ingredient was to be taxed to be left perfectly open for argument before a referee under section 1 (4) of the Act.

Death of Mr. Henry Oertling

WE regret to record the death, on Monday, at his residence, "The Hermitage," Barnes, of Mr. Henry Rowlatt Augustus Oertling, governing director of L. Oertling, Ltd., balance manufacturers, of Turnmill Street, London, E.C. 1. Mr. Oertling, who was the only son of Mr. L. Oertling, the founder of the firm, was educated at the University College, Gower Street, London, and entered his father's business at an early age. From the outset he displayed the greatest interest in his work, and acquired his knowledge of the manufacture of balances at first hand. For considerably over forty years Mr. Oertling took an active share in the management of the business, and those who knew him best affirm that this was



MR. HENRY OERTLING.

his life's work and hobby combined. In earlier years Mr. Oertling spent some of his leisure moments in photographic pursuits.

The first short beam balance made by the firm was produced under his personal supervision, and this balance became known as the "H. O." balance, after its designer. He was the first instrument maker to introduce the continuous plane into balances, and, having made a specimen instrument for the Board of Trade, the principle was so appreciated by that Department that they later insisted that all balances should in future be made on that pattern.

An exceptionally healthy man, Mr. Oertling was rarely ill, until the death of his only son in the war, at the age of twenty-seven, resulted in a breakdown from which he never really recovered. For the past five years he had taken no active part in the management of the business, which was transformed into a private limited liability company after the death of his son. Despite the fact that his health was steadily declining, he still travelled up to London to attend board meetings, and manifested a lively interest in the affairs of the company; he was present at the office even so lately as a fortnight ago.

Mr. Oertling took a great interest in the care of crippled children, whom he aided through Alderman Treloar's Cripples Fund; he also gave a garden-party in the grounds of his residence at Barnes each year for the entertainment of these children. In this work he was ably assisted by his wife, who, as Barnes Secretary of the Fund, has collected a large amount of money for this charity. Mr. Oertling is survived by his widow and three daughters. The interment took place on Thursday at Putney Cemetery, and was attended by a number of relatives and friends.

Society of Chemical Industry

Newcastle-on-Tyne Section

DR. J. H. PATERSON presided at a general meeting of the Newcastle-on-Tyne Section of the Society of Chemical Industry on December 14, when the Saville Shaw medals were presented to Messrs. L. A. Sayce and A. Crawford, who read a short note on "The Estimation of Carbon Di-Oxide in Mineral Carbonates." It was on the basis of this work that the Professor of Chemistry at Armstrong College recommended the award of the medals. A note on "The Agglutinating Value of some Durham Coals" was read by Mr. A. Weighell, in addition to which Mr. H. S. Collins contributed a note on "The Estimation of Lævulose."

Carbon Di-Oxide in Mineral Carbonates

The paper read by Messrs. L. A. Sayce and A. Crawford on the "Estimation of Carbon Di-Oxide in Mineral Carbonates" was an account of experiments undertaken for the purpose of comparing the suitability and consistency of certain methods of estimating carbon dioxide in mineral carbonates, and the minerals chosen for the purpose were calcite, witherite, dolomite, chalybite, and cerussite. The work covered the following methods: Simple ignition, Schrotter's method, and a simple modification of it, a method devised by Dr. F. C. Garrett, of Newcastle, in which the carbon was decomposed by the gradual addition to it of a dilute acid, the evolved CO_2, after drying, being aspirated through caustic potash or soda lime, and, lastly, Collins's calcimeter.

The conclusions arrived at by the authors were to the effect that the accurate determination of the carbonate radicle in minerals was by no means a simple matter. Where it could be applied without complications and where the decomposition temperature was low enough, the method of simple ignition was very consistent. The method of Schrotter was quite unsuitable in estimating carbonates of metals whose sulphates were comparatively insoluble, and if that trouble were avoided by the use of hydrochloric acid there was a danger of loss of the volatile acid. The modified Schrotter's method was a very inexpensive apparatus well adapted for teaching purposes and capable of fair accuracy. Judging by its performance with witherite the apparatus of Dr. Garrett had great possibilities, and further investigations would no doubt indicate the sources of error which accounted for its inconsistency in estimating calcite. Finally, Collins's calcimeter, owing to its compact form, ease of operation, and the short time needed in making a determination, appeared to be particularly well adapted for dealing with readily soluble carbonates when an accuracy of 0.1 or 0.2 per cent. was sufficient.

The Agglutinating Value of Durham Coals

In his note on the "Agglutinating Value of some Durham Coals," Mr. A. Weighell said the agglutinating value was one of the most important properties to be considered in deciding on the suitability of a coal for coke oven or gas producer purposes. In the experiments described the samples were taken from the belts at eight of the collieries of the Consett Iron Co., Ltd., in North-West Durham, by whose permission the Society had the benefit of the research work. Samples representing each seam worked were taken, and in some cases separate samples of "lump" and small were taken for comparison. For the purposes of the tests, the coal samples were crushed to pass a 60 mesh sieve and, as the particle size had an important bearing on the results, it was thought desirable to obtain some idea as to the relative proportions of the crushed sample retained by sieves of various mesh.

The inert material used consisted of electrode carbon as proposed by Sinnatt but, instead of using his method of using fixed weights of inert material of successive degrees of fineness it was decided to use increasing weights of the same grade of carbon. The latter was graded to pass a 100 mesh and to be retained by a 120 mesh sieve, as that size gave the greatest differentiation between coals of similar agglutinating value. One gramme of the dry crushed coal was mixed with such proportion of electrode carbon as would just suffice completely to destroy the caking property of the mixture. Five grammes of the mixture were transferred to a platinum crucible and the contents heated in a crucible furnace over a Bunsen burner for seven minutes. On cooling, the button of coke was placed on the bench and a hundred gramme weight laid upon it; when the button fell to powder under the weight, the proportion of inert material to one gramme of coal was taken to be the agglutinating value of the coal. Tables summarising the results by this process were described by the author. Coals taken from the Brockwell seam showed a difference in agglutinating value for lump of 11.5. The other samples from the same seam, but from different pits, showed an agglutinating value varying from 9.0 to 17.0.

Estimation of Laevulose

Mr. S. H. Collins, in a note on the "Estimation of Lævulose (Fructose) in Straw," said that in the course of some investigations on oat straw it became necessary to determine the amount of lævulose in the straw. It was unfortunate that the information in text books was very superficial. As all sugar chemists were aware, the dark colouring matters accompanying crude forms of sugar gave considerable trouble and were the cause of much inaccuracy in final results. The colouring matters bore a high ratio to the sugar in the case of oat straw. Owing to the bulky nature of straw any efforts to obtain strong solutions met with great difficulty, and attempts at evaporation resulted in failure, even evaporation under reduced pressure, with a slight current of carbon dioxide, proving too destructive to lævulose to permit of practical utility. Continuous extractions on the sugar beet industrial principle proved practicable and accurate, but the colouring matters were also concentrated and it was found in practice that a 10 per cent. solution of straw in a 250 mm. tube gave a solution as dark as could be managed even with the quartz wedge saccharimeter and a special gas filled 100 c.p. electric light. No further increase in accuracy could be obtained either by continuous extraction methods of concentration or by high power illumination. Eventually it was found that a 200 mm. tube was long enough and permitted more uniform heating. It remained, therefore, to make use of solutions which were always under 1 per cent. of lævulose and in which it was desirable that the error should be less than .05 per cent. of lævulose.

After describing the difficulties encountered in the work, Mr. Collins stated that cane sugar, purified by dissolving in water and precipitated by alcohol, hydrolised by hydrochloric acid, neutralised and examined polarimetrically, gave the result as follows: Lævulose grammes per 100 c.c.: taken .527, found .514; taken .700, found .711; taken .700, found .709. With straw containing 5 to 7 per cent. lævulose, the strength of solution would be similar, so that the error of estimating lævulose in straw was about 0.1 per cent. with ordinary end glasses. With carefully annealed end glasses, needing no correction, the error was reduced to about one half that amount. It was possible that the war was responsible for the magnitude of the error in polarimetric readings, due to the temperature variation in the rotations of the cover glasses used to close the polarimeter tubes. Some new glasses, however, gave correction figures of 1.70 per cent. lævulose in straw, whilst some old glasses gave 0.75 per cent. lævulose correction figures. The results of the investigations had shown that with straw containing much sugar three-quarters of the total sugar was lævulose, but when the total sugar was low in amount, lævulose was absent. Where the sugars, other than lævulose, were small in amount the error, due to temperature co-efficient of the polarimetric deflection due to the other sugars, became very small.

Evaporators and Driers for Peat Fuel

THE prospectus is issued, for public information only, of Peco, Ltd., of 47, Victoria Street, London, S.W. 1, with an authorised capital of £75,000. The company, the chairman of which is Sir Arthur Duckham, was incorporated in February last, the prospectus states, to acquire from the Techno-Chemical Laboratories, Ltd., the sole and exclusive world licence (except the French Republic) for a new drier and certain evaporators for the treatment of peat, the utilisation of which is expected to effect a great saving in the cost of production of peat fuel. The prospectus further states that the company is erecting one unit of the new drier capable of dealing with from 35 to 40 tons of raw peat per diem, in order to demonstrate that the process is capable of profitable application on a commercial scale. The estimated cost of this unit is £10,000. This plant is now nearing completion. Arthur Duckham & Co. (1920), Ltd., after a thorough investigation of the experimental drier erected in the laboratories of the Techno-Chemical Laboratories, Ltd., and of the latter company's calculations and estimates, consented to, and have become, the technical advisers and engineers of the company.

Preparation of Gluconic Acid

A New Method Described

A PAPER describing a new method of preparing gluconic acid was read at a meeting of the Birmingham and Midland Section of the Society of Chemical Industry held at the University of Birmingham on Thursday, December 15, by Professor Arthur R. Ling and Mr. Dinshaw Rattonji Nanji (Department of Brewing, University of Birmingham). The authors said it had recently been suggested by A. Herzfeld and G. Lenart that gluconic acid might be employed on a technical scale as a substitute for vegetable acids if a cheap method of preparing it could be devised. Those authors suggested that one part of dextrose should be dissolved in five parts of water, and the solution shaken in a closed vessel with one part of bromine until the reaction was complete; this usually required twenty-four hours. The excess of bromine was then distilled off under diminished pressure from a water bath at a temperature of 50°. Heating was continued until the liquid commenced to colour, when water was added to the extent of 350 times the volume of the liquid, and the hydrobromic acid was neutralised with sodium carbonate. An excess of calcium carbonate was then added gradually at a temperature of 90°. At this temperature any lactone formed during the distillation was reconverted into acid. After two or three days the calcium gluconate separated out and was recrystallised.

Oxidation Velocity

From the economic standpoint the authors of the paper said two objections might be raised against this process. One was the quantity of bromine used (more than the theoretical quantity), and the other was the time required for the oxidation. It was with the object of obviating these disadvantages that the experiments were instituted. If the different factors affecting the velocity of the oxidation of dextrose in the process of Herzfeld and Lenart were considered it would be found that as the oxidation proceeded the concentration of the bromine diminished and, *pari passu*, the velocity of the reaction. Secondly, in the course of the reaction there was an accumulation of hydrogen bromide, and this exercised a retarding influence on the velocity. Thirdly, the reaction proceeded more rapidly as the temperature was increased up to a certain limit—about 50°. Fourthly, to attain a maximum velocity, other things being equal, the reaction should be conducted in direct sunlight.

Use of Calcium Bromide

In the process devised all these points were taken into consideration, and the authors were able to reduce the quantity of bromine employed. Instead of bromine a quantity of calcium bromide, corresponding in potential bromine content with 26 per cent. of the bromine used by Herzfeld and Lenart was employed. The bromine was liberated by passing a slow well-regulated current of chlorine (about one bubble per second) through a 20 per cent. solution of dextrose, containing 0.025 per cent. of cobalt nitrate as catalyst. The reaction was conducted at a temperature of 45°-50°, but care was taken that this temperature limit was not exceeded, otherwise the hypobromous acid might be converted into bromate. As the reaction proceeded there was a constant accumulation of halogen acids, and to avoid their retarding action calcium carbonate was added from time to time. When the theoretical quantity of calcium carbonate was used, and the reaction was carried out so that no secondary changes occurred, the end of the reaction was thereby regulated. The reaction was completed in about four hours. If the chlorine were passed through more rapidly than indicated above, more than the theoretical quantity of calcium carbonate would be required to neutralise the halogen acids, and the yield of gluconate would be diminished.

The solution, when the reaction had proceeded normally to the final point, contained calcium gluconate, calcium chloride, and calcium bromide. When concentrated appropriately the solution deposited calcium gluconate after a few days. If care was taken in working up the mother liquors the yield of calcium gluconate was almost theoretical, say about 90 per cent. By adding strong alcohol to the aqueous solution of the calcium salt, the yield could be augmented.

In conclusion the authors stated that the use of calcium bromide and chlorine was preferable to that of bromine, because bromine in *statu nascendi* acted more efficiently, and because there was no loss by bromine by volatilisation if the operation was carried out under the conditions described.

The Affairs of Mann & Cook

Public Examination Concluded

THE public examination of Messrs. William Mann, Francis Mann, and Joseph Patrick Hosey, trading as Mann & Cook, produce merchants, 7, St. Michael's Alley, Cornhill, London, E.C., was held recently at the London Bankruptcy Court, before Mr. Registrar Francke. According to the statement of affairs the gross liabilities amounted to £257,084, of which £149,313 were expected to rank for dividend. After allowing £3,187 for preferential claims, the assets were estimated to realise £41,326. The assets included, cash in hand, £2,143; stock, £4,622; furniture and fittings, £1,200; good book debts, £29,657, and bad and doubtful debts, £32,877, expected to produce £3,868. It appeared that for seven years prior to 1912 William Mann was in the employ of a firm of Yorkshire manufacturers, and at that date he and Mr. A. L. Cook commenced trading in partnership under the style of Mann & Cook. The joint capital was £750. In 1913 the business was carried on at 27, St. Mary Axe, E.C., but four years later it was transferred to the present address. Branches had been established at Genoa, New York, Liverpool, Sierra Leone, and the Gold Coast. In 1919 William Mann purchased for £39,000 (of which £19,800 was still owing) the business of a firm of merchants carried on at Manchester and Sierra Leone under the style of Canning & Ashwell. The partnership with Mr. Cook was dissolved in June, 1919, when that gentleman retired. He had since received some £3,390 on account of his interest in the business, which was agreed at £6,787. Immediately after the dissolution William Mann took into partnership his brother Francis, who did not introduce any capital. In December of the same year a branch was opened at Rotterdam. In February, 1920, the firm for a consideration of £83,000, payable in fully-paid shares, transferred the African portion of the business to a company called Mann & Cook (West Africa), Ltd. That company had a capital of £500,000. The following month a branch was opened at Sydney, and J. P. Hosey was taken into partnership. In June, 1920, a branch was opened at Marseilles, but it was closed after six months. In May, 1915, the firm began to deal in celluloid under the style of "Tilidge & Co." In March, 1915, under the style of the Gravesend Oil Works, a factory was equipped at West Street, Gravesend, for the manufacture of glycerine for the Government. After the Armistice the business was abandoned, and the plant, &c., was sold by auction.

In answer to Mr. J. T. Garton, Official Receiver, a detailed history of the firm's trading was given by William Mann, who stated that the failure of the firm was due to the two slumps which had taken place in trade. The first was the post-Armistice slump which began early in 1919 and lasted for about six months. During that period prices fell by as much as 40 per cent. Then the market recovered, but the second slump commenced shortly before the middle of 1920, and was of a much more disastrous character. The failure was also due in part to the conversion of some of the free assets into shares of the limited company, which subsequently depreciated very heavily. He also pointed out that both buyers and sellers had defaulted. Balance sheets had been regularly prepared, but they could not be completed for months after the trading periods had ended owing to the necessity of obtaining particulars from overseas. A large stock was carried, and the firm had been dependent on bank overdrafts. During the year to June, 1917, there was a bank overdraft of over £60,000, while the capital stood at approximately £24,000. A year later the overdraft had gone up to £98,000, while there was stock of £138,000, and book debts of £81,000, while the capital was £30,000. In June, 1919, the bank overdraft stood at £113,000, with stock of £116,000, and book debts of £92,000, while the capital had fallen to £8,000. That balance sheet was not available until after the receiving order was made last February. The debtor went on to state that since the Armistice the stocks had fluctuated very considerably. The firm had always met its debts as they became due, and he agreed with the Official Receiver that they were only able to do so by pledging practically the whole of the stocks. They had no idea of the position as it really existed.

The Official Receiver pointed out that the debtor must have known that they were losing money since June, 1919, and the witness replied that, although they knew they lost on some transactions they made a profit on others. The Official Receiver said that a surplus of £18,000 in September, 1920, became a deficiency of over £100,000 in February,

1921. The witness said that he did not realise the firm's position until February last. The other debtors, Francis Mann and J. P. Hosey, were also questioned by the Official Receiver, and agreed with the evidence given by their partner, and the examination was concluded.

The claims of fully-secured creditors total £16,684, and amongst the unsecured creditors are the following: Anglodol, Ltd., Berkhampstead, £14; J. Bibby & Sons, Ltd., Liverpool, £399; British Extract Co., Hull, £1,015; British Oil & Cake Mills, Ltd., Rochester, £818; Burmah Oil Co., Ltd., London, £205; F. W. Berk & Co., London, £22; Brown & Forth, London, £13; Brotherton, Harrop, & Co., Manchester, £126; H. B. Bowen, Manchester, £1,310; C. T. Bowring & Co., Liverpool, £1,187; Coleman & Co., Ltd., Norwich, £25; Chaston Chapman, London, £11; Cromograph Enamel Co., Wolverhampton, £21; Calico Printers' Association, Ltd., Manchester, £363; A. L. Cook, London, £2,255; Eastern Counties Bone Co., Cambridge, £251; Fairclough, Dodd, & Jones, London, £56; Gilbertson & Co., Ltd., Pontardawe, £205; Hull Oil Manufacturing Co., Hull, £11; J. F. Hulton & Co., Manchester, £1,200; M. E. Julien, Marseilles, £9,448; Le Personne & Co., Ltd., London, £44; London Lubricants, Ltd., London, £50; Lewis, Lattimer, & Co., Ltd., London, £1,094 and £1,227; Maypole Co. (1889), Ltd., Birmingham, £18; Mann & Cook (West Africa), Ltd., London, £28,000; Chas. Page & Co., Ltd., London, £23; Smith Chemical Co., London, £94; Sindacats Olii Grassi Lufrificcanti, Milan, £558; Suffolk Fat & Bone Co., £189; Vulcan Chemical Co., Ltd., London, £189; Vesta Oil & Cake Mills, Liverpool, £88; and Worthington & Boler, London, £222.

Sulphate of Ammonia

Revised Prices for Season 1921-22

THE British Sulphate of Ammonia Federation, Ltd., in announcing their prices for spring delivery, state that they are considerably lower than those now being obtained for export. For home agricultural use the following prices are announced:

JANUARY DELIVERY, 1922.—£16 3s. per ton for neutral quality in fine friable condition, free from lumps, containing 25¾ per cent. ammonia; or £15 per ton for ordinary quality containing 25¼ per cent. ammonia.

FEBRUARY DELIVERY, 1922.—£16 13s. per ton for neutral quality; £15 10s. per ton for ordinary quality.

MARCH-APRIL-MAY DELIVERY, 1922.—£17 3s. per ton for neutral quality; £16 per ton for ordinary quality.

Deliveries to consumer's nearest station or wharf in Great Britain for cash payment, in lots of 4 tons and upwards.

Neutral sulphate of ammonia, guaranteed not to contain more than .025 per cent. free acid, will be sold on the basis of 25¾ per cent. ammonia, with no charge if over 25¾ per cent. but with an allowance per ton of—

3s.	if the content of ammonia is under						25¼%	but not under		25½%
6s.	,,	,,	,,	,,	,,	,,	25½%	,,	,,	25¼%
9s.	,,	,,	,,	,,	,,	,,	25¼%	,,	,,	25 %
12s.	,,	,,	,,	,,	,,	,,	25 %	,,	,,	24¾%

A further allowance of 9s. 6d. per ton will be made should the content of free acid exceed .025 per cent, and an allowance of 9s. 6d. per ton will also be made, should any delivery of neutral sulphate not be in fine friable condition free from lumps.

Ordinary sulphate of ammonia will be sold on the basis of 25¼ per cent. ammonia, with no charge if over 25¼ per cent., but with an allowance per ton of—

3s.	if the content of ammonia is under						25¼%	but not under		25 %
6s.	,,	,,	,,	,,	,,	,,	25 %	,,	,,	24¾%
9s.	,,	,,	,,	,,	,,	,,	24¾%	,,	,,	24½%
13s.	,,	,,	,,	,,	,,	,,	24½%	,,	,,	24¼%
19s.	,,	,,	,,	,,	,,	,,	24¼%	,,	,,	24 %
26s.	,,	,,	,,	,,	,,	,,	24 %	,,	,,	23¾%

If ordinary sulphate is ground, pulverised or otherwise rendered free from lumps at buyer's request, an additional charge of 7s. 6d. per ton will be made.

The above qualitative increase and deductions apply only to deliveries of 2 cwts. and over.

The above prices are delivered free in 4 ton lots and upwards to buyer's or consumer's nearest railway station or wharf in Great Britain (or f.o.b. British port when the ultimate destination is Isle of Man); and packed in single bags containing about 2 cwt. net to be supplied free by sellers, tare allowed.

For deliveries of less than 4 tons the following extra charges will be made:—

2 tons and over,	but less than				4 tons,	5s.	per ton over 4 ton price.			
1 ,,	,,	,,	,,	,,	2 tons,	10s.	,,	,,	,,	,,
2 cwt.	,,	,,	,,	,,	1 ton,	1s.	,, cwt.	,,	,,	,,
1 cwt.	,,	,,	,,	,,	2 cwt.,	2s.	,,	,,	,,	,,
28 lb.	,,	,,	,,	,,	1 cwt.,	3s.	,,	,,	,,	,,
14 lb.	,,	,,	,,	,,	28 lb.,	4s.	,,	,,	,,	,,

The Peachey Process Company

Applications for Additional Patents

IN the course of his speech at the annual meeting of the Peachey Process Co., Ltd., held on December 15, at Winchester House, London, E.C., Sir J. P. Hewett (the chairman) said that after viewing numerous premises, a suitable building in Willesden was purchased and equipped with appropriate machinery and plant and modern laboratories. By adopting a careful policy in regard to the structural alterations of the building, selecting, purchasing, and installing the necessary plant, &c., the directors were able to carry out this work at a cost of slightly over £13,000, thereby effecting a saving of £6,500 on the estimated cost. The equipment of the laboratories and demonstration works could now be regarded as completed for the purposes both of demonstrating effectively the process and of carrying out research work on the vulcanisation of rubber gases and other agents. The laboratory staff comprised seven assistants with Mr. Peachey as superintendent. The works were opened in May, but the equipment was not completed until the end of June, just after the rubber exhibition was held. The company's exhibits at the exhibition were prepared at the works, and covered a wide range of products. As a result of the publicity gained at the rubber exhibition, the inquiries as regards the process were very largely increased, and upwards of 370 interested persons from the United Kingdom, France, Belgium, Holland, Denmark, Sweden, Norway, Latvia, Italy, India, South Africa, Canada, Australia, the United States of America, Brazil, Japan, Ceylon, and Malaya had witnessed demonstrations at the works. Applications for patents based upon the original British patent had been made in thirty-five different countries, and patents had already been granted in fifteen countries.

As a result of research work in the company's laboratories, applications had been made for several additional patents, and work on original lines was proceeding with the object of improving existing methods and discovering new applications and important improvements of the process. They were negotiating in respect of licences for the manufacture and sale of Peachey solution and for the curing of proofed fabrics. They had advanced to a stage at which there was every prospect of their being brought to a satisfactory conclusion. The company had entered into an agreement for the manufacture of Peachey products in Ceylon, the Federated Malay States, and the Straits Settlements. They had also been able to enter into an agreement, the details of which it would not be desirable, in the interests of the company, to make public at present, but which ought to ensure the complete and general development of the process in the United States of America.

Russian Chemical and Dyestuff Trusts

THE Helsingfors correspondent of the *Morning Post* gives interesting details relating to a number of trusts which have recently been formed in Russia. In the chemical industry, he states, the Chimugol Trust has been founded in the Lisitschansk area, on the Donetz. This trust has undertaken to set the soda, chemical, glass, and dye factories of this area working again. It has already set at work the principal soda factory in the Donetz region, which had been at a standstill for two years. An Aniline Dye Trust and a Drug Trust (including the Mamantovka factory at Moscow and the Olovjanischnikov and Vachramejev factories at Jaroslav) have been formed. These trusts are formed on purely capitalist principles. Except that the State reserves for itself the duty of regulating their production in accordance with the general national scheme of production, they are absolutely independent. The first thing the State asks of them is that they shall relieve it of the duty of providing for the workmen they employ. Their workmen are struck off the lists of those receiving Government rations, and have to provide themselves with the necessities of life out of their pay.

Scrap Iron Drums Contract
Workmen Injured by Gas Fumes

At the Scottish Court of Session, on Friday, December 16, Lord Sands pronounced judgment in an action by William M. Waddell, iron and steel drum merchant, Warwick Lane, London, against the Lord Advocate, representing the Treasury, as successors of the Minister of Munitions, for payment of £41 5s. and £3,149 5s. The pursuer sued as assignee of Robert Thomson & Co., 60, St. Enoch Square, Glasgow, of which he was formerly a partner. He explained that in November, 1919, Messrs. Thomson purchased forty-eight scrap drums, weighing 3 tons 15 cwt., at £3 per ton. The drums were lying at the National Filling Factory, Banbury, whence they were despatched on May 6 to the works of Messrs. Waters Brothers, Barrhead, for the purpose of being overhauled and repaired, all in the same way as in previous transactions between the parties. While the drums were undergoing a preliminary overhauling at the Barrhead works it was found that they contained liquid, and about 40 gallons were emptied out of four drums. Within a few hours of the commencement of the work all the men engaged, or brought into contact with the drums, became dangerously ill, and one of them died. It was then discovered that the contents of the drums consisted of mustard gas or other noxious gas. Following upon the discovery, the works were closed by the authorities for three and a half months for the protection of the public, while the drums were removed by the authorities, taken out to sea, and destroyed. The first sum concluded for represented the value of these drums. The second sum represented depreciation due to the action of the weather, together with the destructive acids they had contained, on 7,147 other drums which the pursuer had lying at Messrs. Waters, and damages for loss of market and profit in consequence of the three and a half months' delay.

The defender denied being in breach of contract, and pleaded that the drums, having been purchased under the conditions set forth in the acceptance of tender, the Ministry was not liable for any loss the pursuer might have suffered, that the damage complained of was too remote, and that the Ministry was not liable for the fault or negligence of any of its servants.

The Lord Ordinary dismissed the action in so far as laid upon the fault or negligence of the servants of the Ministry and continued the cause.

His Lordship said upon the averments, the drums were not merchantable as scrap iron or for any other purpose, being contaminated by a highly dangerous substance. Under the terms of the contract the pursuer must be held to have inspected them, and the defender was not liable for any defect rendering them unmerchantable which might have been discovered by the exercise of reasonable care in inspection. The pursuer's position was a somewhat difficult one, for he averred that had the defender examined the drums he would have found them to be in a highly dangerous condition. This admission would be conclusive against the pursuer if the mischief or defect had been one cognisable by an ordinary iron merchant inspecting goods which he proposed to purchase. But mustard gas was a new and mysterious thing. It might well be that what ought to have been discovered by the skilled inspectors of the Ministry would not have been discovered by an ordinary iron merchant. Even the discovery that there was some liquid might have excited no suspicions, particularly if this was innocent rinsings. Even on the assumption that it was the duty of the purchaser to draw a bung, take out a little of the liquid and smell or taste it, his Lordship did not know that this would have disclosed anything alarming. He knew nothing about mustard gas. He did not, however, find any averment by the pursuer that the presence of a dangerous fluid or gas would not have been discovered upon inspection by a careful man of ordinary skill in the inspection of old iron. The nearest he came to it was "denied that the pursuer had any opportunity of inspecting or examining the said drums which would have enabled him to have discovered their condition." His Lordship did not think that would do, in view of the terms of the contract. It was vague, ambiguous, and indefinite. He would accordingly give the pursuer an opportunity to amend; but if he preferred to stand upon the present record, his Lordship would dismiss the action. The question of remoteness of damage was argued. As he had already stated, he knew nothing about mustard gas, and he would not be prepared, without inquiry, to come to any conclusion as to what consequences were too remote to be a ground of damages when such an agent was let loose.

American Notes

The International Nickel Co. has closed down its offices in Canada and will in future conduct its business from New York.

A number of prominent Japanese manufacturers of chemicals and dyes have been visiting the United States with a view to fostering trade between the two countries.

Mr. F. H. Beach, of Bush, Beach, & Gent, and Mr. H. Wigglesworth, lately of the General Chemical Co., recently left the United States on a visit to Europe.

A world-wide oil company, to be known as the World Commerce Co., is being organised in Philadelphia. It is reported that the authorised capital will be $2,000,000,000.

The death occurred recently at Bergenfield, New Jersey, of Mr. Charles Lindsay, chemist to the G. R. Carnvick Co., of New York. Mr. Lindsay was born in Montrose, and received his training at Aberdeen University.

The Commissioner of Internal Revenue has again authorised Formula No. 1 for completely denatured alcohol. The formula, which was suspended last January, reads: "To every 100 gallons of ethyl alcohol add 10 gallons of approved wood alcohol and ½ gallon of approved benzine.

The American Institute of Chemical Engineers held its annual meeting at the Emerson Hotel, Baltimore, from December 6 to 9. The delegates, who numbered over 100, visited the Government arsenal, at Edgewood, and the works of a number of local chemical manufacturing companies.

Professor C. Moureu, of the French Société de Chimie Industrielle, and professor at the College de France, is attending the Washington Conference on Disarmament. During the war, Professor Moureu was president of the committee of scientists who directed the French Chemical Warfare Service.

The Perkin Medal for 1921 will be presented to Mr. W. R. Burton at the meeting of the American Section of the Society of Chemical Industry to be held at the Chemists' Club, New York, on January 13 next. The award, it will be recollected, is in recognition of Mr. Burton's work on the distillation of petroleum under pressure.

A warning against the storage of calcium carbide with explosives has been issued by the United States Bureau of Mines. In a recent explosion investigated by the Bureau it was found that two drums of carbide had been stored in a magazine containing high explosives, and that there was a box of explosive in close proximity to a drum of carbide.

The sub-committee, composed of members of the Committee on the Limitation of Armaments, sitting in Washington, has appointed a board to conduct inquiries into the use of poison gas in warfare. The subject of chemical warfare is being very freely discussed in America, and Mr. F. P. Garvan, speaking at a meeting of the New York Section of the American Chemical Society, said the future safety of the nation depended upon the development of aircraft and a chemical industry, which, in time of war, could quickly be turned into a source of supply for munitions and poison gas. In accordance with a War Department order, American troops are to be trained in offensive and defensive chemical warfare.

The American Association of Textile Chemists and Colourists was formed recently, with Professor L. A. Olney as president. The objects of the Association are: To promote the technical interest of its members in the properties and application of dyes and the process of scouring, bleaching and finishing; to develop a closer relationship between theory and practice in the application of dyes and other chemicals used in the textile industry; to serve the textile and colour industries by developing standard methods of testing dyes and analysing textile materials and of standardising systems for these tests and recording their results; to encourage research; and to supervise the establishment of a textile chemical library.

A case at Boston, U.S.A., in which Mr. Edgar Levinstein, formerly United States representative for Levinstein, Ltd., of Manchester, sued E. I. du Pont de Nemours & Co., of Wilmington, Del., for $1,000,000 for alleged breach of contract, and the hearing of which was commenced in May, 1919, has been settled out of Court. It appears that in 1916 the du Pont Co. bought from Levinstein, Ltd., the exclusive right to manufacture and sell Levinstein dyes in America. The plaintiff alleged that the defendants had not carried out an agreement which provided that he should have certain rights, including a supply of the English company's dyes at a price which would allow him a reasonable profit. The terms of settlement were not announced.

From Week to Week

CONSIDERABLE DAMAGE was caused by fire recently at the soap works of Sapon Soaps, Ltd., Wharf Road, Cubitt Town, London, E.

It is reported from Australia that LARGE DEPOSITS OF GYPSUM situated at Lake Macdonell and Tresco are now being worked at a profit.

REAVELL & CO., LTD., of Ipswich, announce that their works are closed for the Christmas holidays from last night (Friday) until December 29.

The works of MANLOVE, ALLIOTT, & CO., LTD., chemical engineers, Nottingham, are closed from to-day (Saturday) until January 2 next. The offices will be closed on December 26 and 27.

THE UNIVERSAL VALVE & CHEMICAL ACCESSORIES CO., of Dudley Hill, Bradford, announce that their works will be closed for the Christmas holidays from December 22 to January 2 next inclusive.

SIR WILLIAM POPE received the honorary degree of Doctor of Science at a special Convocation of Calcutta University held last week to confer degrees in commemoration of the visit of the Prince of Wales to India.

The Commonwealth of Australia invite TENDERS BY DECEMBER 30 for laboratory glassware, glucose, peptone, and magnesium oxide. Full particulars and tender forms may be obtained from the Supply Officer, Australia House, Strand, London, W.C. 2.

DR. H. F. COWARD has been elected Chairman of the Chemical Section of the Manchester Literary and Philosophical Society for the 1921-22 session. Sir Ernest Rutherford, Sir Arthur Schuster, Professor G. Elliott Smith, and Professor Horace Lamb have been elected honorary members.

The death is announced, at the age of fifty-four years, at Westhoughton, near Wigan, of MR. J. HAWORTH, who had recently represented British Glues & Chemicals, Ltd., in the Midlands. Mr. Haworth, who was a prominent Freemason, formerly carried on business as a chemical manufacturer.

In the course of a lecture at the London School of Economics on December 16, Professor Irving Fisher announced that he had been credibly informed that a German chemist had already succeeded in the laboratory in making "SYNTHETIC" GOLD OUT OF BASER METALS by means of the electric vacuum furnace.

The usual monthly meeting of the CHEMICAL INDUSTRY CLUB was held on Monday evening. Mr. W. Cullen was elected to the chair, and there was a good attendance. Dr. W. R. Ormandy gave an interesting lecture on the "Making of a Mirror," and this was followed by a short discussion.

On Wednesday, DR. GEORGE DOWNING LIVEING, F.R.S., reached his ninety-fourth birthday. He was Professor of Chemistry at Cambridge from 1861 to 1908, and started the first laboratory for students there in 1852. The Senate recently presented to him a congratulatory address, written by the Public Orator.

According to an Exchange message from Berlin, the seven companies of the chemical and dyes trust have decided to RAISE THEIR CAPITAL by approximately 10 per cent. The Höchst, the Badische and Bayer Companies will each raise an additional 40 million marks in ordinary shares, and the four smaller companies smaller amounts.

PROFESSOR H. B. DIXON, who, as announced in THE CHEMICAL AGE last week, is retiring at the end of the present session from the Sir Samuel Hall Chair of Chemistry at Manchester University, intends to continue his researches in the chemical department there, where the equipment necessary for his investigations has been built up.

Applications are invited for the VACANT POST OF LECTURER IN CHEMISTRY at the University College, Johannesburg. Applications, with copies of testimonials, all in duplicate, should be lodged not later than December 31 with the Secretary, Office of the High Commissioner for the Union of South Africa, Trafalgar Square, London, W.C. 2, from whom further particulars may be obtained.

The trustees of the Ferguson Bequest Fund have unanimously approved the appointment of Henry Hyman, B.Sc., Glasgow, 1913, to be the first FERGUSON FELLOW for research in Applied Chemistry. The Fellowship is of the value of £200 a year for two years. The research may be carried out at Glasgow University, the Royal Technical College, or elsewhere, as the Fellowship Committee may direct.

The third ordinary meeting of the Edinburgh and East of Scotland Section of the Society of Chemical Industry was held in Edinburgh on December 13, Dr. H. E. Watt in the chair. A discussion on "Methods of Drying" was opened by Mr. H. R. Baxter. This was followed by a short paper by Mr. W. G. Martin, in which modern driers were fully described and illustrated by means of sectional drawings.

Sir Jesse Boot has given a large park, known as the Highfield Estate, situated between Nottingham and Beeston, as a site for the PROPOSED EAST MIDLANDS UNIVERSITY. Sir Jesse Boot is giving £100,000 towards the new buildings and £50,000 towards the endowment fund. He is also bearing the cost of the construction of a wide boulevard, one and a half miles long, connecting the site with Nottingham.

We regret to record the death on Wednesday, at "Iddesleigh," Crescent Road, Kingston Hill, Surrey, of SIR CHARLES HENRY BURGE. Sir Charles, who was seventy-five years old, was a Fellow of the Institute of Chemistry, having been associated with that body since 1878. The interment takes place to-day (Saturday) at Kingston Cemetery, and will be preceded by a memorial service at St. Paul's Church, Kingston Hill.

The annual report of the directors of ENGLISH OILFIELDS, LTD., states that Major-General Sir George Scott-Moncrieff, in consequence of ill-health, found himself compelled to resign his membership of the board. Dr. Forbes Leslie has also resigned his office of director. He has commenced an action against the company, claiming payment for certain services rendered and for certain expenses. The action is being defended by the company.

At the Memorial Institute, Park Road, Wallsend, on December 12, the Rt. Hon. G. W. Balfour, Chairman of the directors, unveiled a roll of honour to the EMPLOYEES OF THE CASTNER-KELLNER ALKALI CO., LTD., WALLSEND, who served in H.M. Forces during the war. Of these no fewer than sixty-six men have returned to the works, nine having lost their lives. Illuminated addresses were presented to relatives of the fallen and also to those who had returned.

After eighteen years' service, MR. JENKIN EVANS, manager of the Arrow Patent Fuel Works, Newport, has retired, and on December 17, at a gathering over which Mr. D. R. Evans, the newly-appointed manager, presided, he was the recipient of a number of gifts from the staff and workmen. Before going to Newport, Mr. Evans was for many years manager of the Graigola Patent Fuel Works in the Swansea Valley. His services will be retained by the Arrow Co. in an advisory capacity.

Lecturing before the Liverpool Section of the Society of Chemical Industry on December 16, Mr. R. Thomas dealt with the RECOVERY OF SOLVENT VAPOURS FROM AIR. Although the question was very important during the war, said Mr. Thomas, it was no less important in peace-time, for on the successful outcome of experiments there was a hope of avoiding the tremendous amount of waste that some industries had to bear. Mr. Thomas, who dealt particularly with the recovery of alcohol, demonstrated his results by means of formulæ.

The death took place, on December 17, of MR. J. VEALE WILLIAMS, managing director for a number of years of Austin's, Ltd., manufacturing chemists, of 196, Bermondsey Street, London, S.E. 1. Mr. Williams, who was fifty-three years old, was visiting the Town Hall, Bermondsey, when he was suddenly taken ill, and died, presumably from heart failure. He was an alderman of the last Bermondsey Borough Council. The interment took place on Wednesday at Nunhead, and was preceded by a funeral service at Bermondsey Parish Church. In addition to his widow, Mr. Williams leaves a son and a daughter.

Dr. Leonard Dobbin presided at the annual meeting in Edinburgh of the East of Scotland Section of the Institute of Chemistry, when the following office bearers were elected: Chairman, Dr. L. Dobbin; vice-chairman, Dr. A. Lauder; hon secretary, B. D. W. Luff; committee: W. L. Brown, A. M. Cameron, S. C. Farrar, W. T. H. Williamson. Dr. Dobbin read a paper on Famous Edinburgh Chemists of the Eighteenth and Nineteenth Centuries, in which he referred to Professor Black, who discovered carbon dioxide, and to Lord Playfair, who carried out important investigations on the composition of blast furnace gases.

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STARCH. Contribution to the knowledge of starch. J. J. L. Zwikker. *Rec. Trav. Chim. des Pays-Bas*, November 15, 1921, pp. 605-615.

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Patent Literature

Abstracts of Complete Specifications

171,418. Chlorine Compounds which may be Rendered Dispersible, Preparation of. W. H. H. Norris, 20, Church Lane, Prestwich, Lancs., and J. H. Hoseason, Stanley Bank, Chesham Place, Bowdon, Cheshire. Application date, May 7, 1920.

The process is for the manufacture of chlorinated compounds which are suitable as general antiseptics. These compounds are obtained by the reaction of chlorine with "sharp oil"—*i.e.*, that portion of distilled coal tar or blast furnace tar known as creosote oil from which phenol, cresols and xylenols have been removed. These substances are removed by washing the oil with the necessary proportion of a 15 per cent. solution of caustic soda, which exerts a known selective action, leaving the high boiling acids in the oil. The amount of caustic soda required is estimated by distilling a sample of the oil and separately collecting three fractions, viz., those between 180° and 185°C., those between 185° and 205°C., and those between 205° and 220°C. These fractions are a measure of the proportions of phenol, cresols, and xylenols, so that the amount of caustic soda required to remove these is readily determined from theoretical considerations. The sharp oil is preferably dissolved in a solvent such as carbon tetrachloride and chlorine is then added either as a gas or as sodium hypochlorite or sulphuryl chloride. The proportion of chlorine should be 80-140 per cent. by weight of the sharp oil, and the reaction vessel is cooled. The product is rendered dispersible with water by adding alkali, with or without emulsifying agents, such as fatty or resin soaps, sulphonated fatty oils, or acids, casein, gelatine or naphthenates.

171,432. Cellulose Acetate and like Cellulose Derivatives, Process for the Production of Moulded Articles from. A. L. Mond, London (from Cellon-Werke, Dr. A. Eichengrün, Wilmersdorferstrasse, 85, Charlottenburg, Germany). Application date, July 9, 1920. Addition to 147,904.

Specification No. 147,904 (*see* The Chemical Age, Vol. III., p. 454) describes a process for producing moulded articles from finely divided cellulose acetate and pulverised filling materials, and with or without camphor substitutes or softening agents. The mixture is forced at high temperature and pressure through channels or jets or disintegrated mechanically and then pressed in moulds. It is now found that the disintegration is facilitated if the hot material is extruded through narrow irregular or sinuous channels into a mould in which it is again subjected to pressure and heat. The actual process of producing a moulded article is described in detail.

171,479. Alcohol, Preparation of. W. R. Walkey, 55, Victoria Street, London, S.W. 1, and A. F. Bargate, 20, Lawrence Lane, London, E.C. 2. Application date, August 16, 1920.

The process is for producing alcohol, wood spirit, and acetone from seaweed. The seaweed is macerated in four times its weight of cold water, which extracts most of the salts present, together with mannite, dextrine, and an albumenoid substance. The liquor is heated for four hours in an autoclave at a pressure of 7 to 8 atmospheres, which converts the organic materials into glucose. The liquor separates, on cooling, into two layers, the upper of which contains glucose and other fermentable matter. The residue consists principally of algin and is disintegrated and digested with four times its weight of sulphuric or hydrochloric acid of 4 per cent. strength. The mixture is then heated for six hours in an autoclave at a pressure of 7 to 8 atmospheres, which similarly converts the albumenoid matter into glucose. These two glucose solutions are mixed, neutralised with chalk, and the precipitate filtered off. The solution is fermented with yeast and the alcohol distilled off. Wood spirit and acetone may be obtained by dry distilling the organic residue from the digestion process.

171,490. Separation and Recovery of Metals from Metal Alloys, Method for. A. L. Mond, London. (From Metallbank und Metallurgische Ges. Akt. c Ges., 45, Bockenheimer Anlage, Frankfurt-on-Main, Germany.) Application date, August 18, 1920.

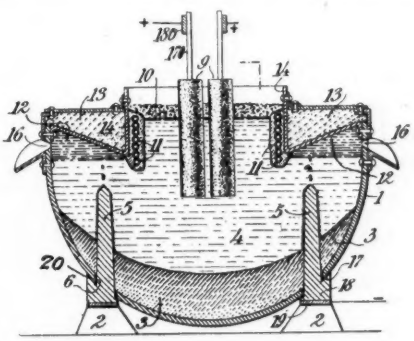
The process is for treating metal alloys such as impure metals to purify them or to recover the constituents eliminated. It is found that when alkali metals or alkaline earth metals, such as sodium, calcium, magnesium or beryllium, are added to molten alloys a selective combination with certain metals in the alloy occurs, and such compounds have a different melting point and a different specific gravity from the remainder of the alloy, so that they may be separated by known methods. As an example, lead or tin may be purified from antimony, bismuth, tin, copper, zinc and the noble metals, by adding sodium, calcium or magnesium. Similarly, bismuth may be purified from antimony, arsenic, tin, lead, copper and tellurium, aluminium may be purified from silicon, and zinc from antimony or arsenic. When tin or lead is to be treated to remove antimony, arsenic or bismuth, sodium is usually added, but if copper or noble metals are required to be removed from lead or tin it is necessary to add calcium, magnesium or barium. In other cases it may be necessary to treat the alloy with sodium and calcium in succession. The alloys thus produced either separate out by stratification or may be separated out by segregation or liquation. Several examples showing the results obtained by the process are given—*e.g.*, a tin alloy containing 15 per cent. of antimony was treated with 4 per cent. of sodium, and the resulting alloy separated by stratification, the upper part containing 43 per cent. of antimony, and the lower part 4.3 per cent. of antimony.

171,495. Hydrogen Gas from Iron and Steam, Retort Furnace with External Firing for the Generation of. M. Nöding, 1, Lindenstrasse, Pforzheim, Germany. Application date, August 20, 1920.

The apparatus is for generating hydrogen rapidly and economically. The iron is contained in retorts consisting of drawn iron tubes, which are arranged around the inside of a circular casing. The retorts are externally heated by means of a burning jet of tar oil which is injected axially into the casing from one end so that the flame is in contact with all the retorts. Alternatively, the retorts may be arranged to form a triangular, elliptical or other group when two or more heating burners are used. It is found that the wrought-iron tubes are more durable, and that hydrogen is produced more rapidly by means of the oil heating.

171,502. Electrolytic Apparatus. G. O. Seward, Hotel Wellington, Seventh Avenue and Fifty-fifth Street, Manhattan, N.Y., U.S.A. Application date, August 23, 1920.

The apparatus is more particularly for electrolysing molten salts or compounds such as the haloid salts of metals, which are of higher specific gravity than the metal liberated from them. A vessel 1 of wrought iron is supported on blocks 2



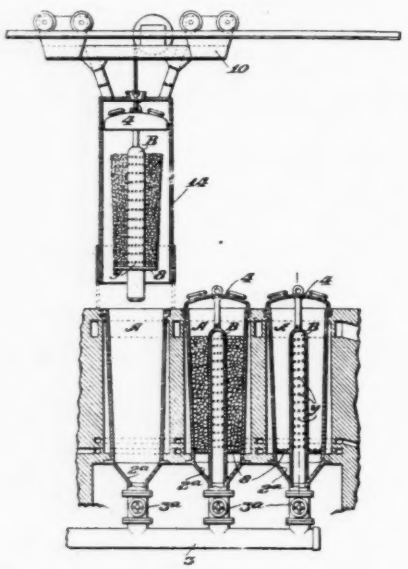
171,502.

so as to allow a circulation of air beneath it, and thus solidify the material in the lower part. The cathodes 5 are of iron and are fixed in the bottom of the vessel so as to rest on the blocks 2. The anodes 9 are of carbon or graphite, and depend into the bath between the cathodes. In the case of the electrolysis of a magnesium salt such as the fluoride, a layer of magnesium oxide or carbonate is placed on the surface of the bath so that it is dissolved progressively by the liberated fluorine during electrolysis. The molten metal liberated at the cathodes is collected in hoods 12 which are supported

in the upper edges of the vessel 1. The hoods 12 are separated from the rest of the bath by walls 14 and by a vertical partition of insulating material which is produced by solidifying a portion of the molten material around the pipes 11 which are traversed by cooling air or water. The metal is kept molten by the provision of protecting coverings 13 of kieselguhr, and is drawn off continuously or intermittently at the outlets 16. The electrolyte 4 is kept molten at a temperature of 900°-1,000°C. by the passage of the current through it, so that there is no tendency for the material in the bottom of the vessel to become molten, and the joints between the cathodes and the bottom of the vessel are thus maintained fluid-tight. The cathodes 5 are supported on flat copper bars 19 which thus support the weight of the vessel and a good electrical contact is secured.

171,563. Distilling Carbonaceous Materials, Apparatus for. G. W. Wallace, 1605, North Forty-Sixth Street, East St. Louis, Ill., U.S.A. Application date, September 24, 1920.

The apparatus is for distilling coal or other carbonaceous material in such a way that the maximum yield of oil is obtained. Means are also provided for discharging the coke residue in an upward direction, and removing it to a quenching apparatus. The apparatus is particularly suitable for distilling carbonaceous materials which become agglomerated



171,563.

during heating. The vertical retorts A taper slightly from top to bottom, and are arranged in a setting so that heating chambers *x* surround each retort. The take-off pipe B for gas and vapour projects upwards centrally into the retort and has perforations y over the greater part of its length. The lower end of the pipe is open and the edges are bevelled so that it seats on the lower conical portion 2*a* of the retort. The gases may thus be drawn off through the valve 3*a* to the discharge pipe 3 in which a reduced pressure is maintained. The pipe B carries a lateral flange 8 which supports the charge of carbonaceous material in the retort, and each retort is covered by a liquid-sealed cover 4, to which the pipe B is attached. The discharging apparatus comprises a hollow member 14 suspended from an overhead travelling crane 10, which may be brought above any retort. The contents of the retort, including the pipe B, cover 4, flange 8, and contained material, are then raised into the hollow member 14, which protects the coke from oxidation while it is being conveyed away.

171,652. Crushing, Pulverising, Grinding, and Like Mills. J. S. Withers, London. (From Etablissements C. H. Candlot, Soc. Anon., 37, Rue du Rocher, Paris.) Application date, March 29, 1921.

The apparatus is of the kind in which pulverisation is erected by means of a grinding roller on a vertical axis, co-operating with the interior surface of a horizontal grinding ring. The grinding roller is supported at the upper end of a driving shaft, the lower end of which is provided with a spherical footstep bearing. The grinding roller is slightly tapered so that it forms part of a cone the apex of which would be at the centre of the spherical bearing. The grinding ring also forms part of a cone with its apex at the same point, but having a slightly larger diameter than the roller. When the grinding roller is rotated in contact with the grinding ring, it is compelled to roll or gyrate upon the latter by reason of the friction between the two surfaces. The material to be pulverised is delivered into the apparatus at the top and discharged at the bottom.

Note.—Abstracts of the following specifications which are now accepted appeared in The Chemical Age when they became open to inspection under the International Convention: 147,001 (Farbwerke vorm. Mesiter, Lucius & Bruning) relating to anthraquinone derivatives, *see* Vol. III., p. 382; 147,495 (J. Kersten) relating to decomposition of alkali chlorides, *see* Vol. III., p. 429; 147,736 (C. Still) relating to direct recovery of ammonia from the products of destructive distillation of coal, *see* Vol. III., p. 430; 147,904 (Cellon-Werke, Dr. A. Eichengrun) relating to production of moulded articles from cellulose acetate, *see* Vol. III., p. 454; 149,982 (Barrett Co.) relating to production of resin, *see* Vol. III., p. 569; 155,782 (J. Starrels) relating to producing fatty acids of high purity and melting point, *see* Vol. IV., p. 287; 160,433 (Farbwerke vorm. Meister, Lucius & Bruning) relating to anthraquinone derivatives, *see* Vol. IV., p. 593; 164,358 (Standard Oil Co. of New York) relating to distilling petroleum and other hydrocarbon oils, under pressure, *see* Vol. V., p. 167.

International Specifications not yet Accepted

170,817. Recovering Carbon Bisulphide from Viscose. A. Kampf, Premnitz., Germany. International Convention date, October 28, 1920.

To recover carbon bisulphide during the manufacture of fibres, &c., from viscose, the material is suspended in a bath through which a current of water at about 55°C. flows. This temperature is sufficient to vaporise the carbon bisulphide without injuring the material, and the vapour is collected in a hood suspended over the bath and dipping into the liquid. The vapour passes by a pipe to a condenser.

170,840. Nitric Acid. Norsk Hydro-Elektrisk Kraelstofaktieselskab, 7, Solligaten, Christiania. International Convention date, October 27, 1920.

A mixture of oxygen, excess of liquid oxides of nitrogen, and dilute nitric acid or water, is passed through a tower packed with quartz, and then passed to a vat and allowed to settle. The mixture settles in two layers, the lower consisting of aqueous nitric acid of 80-90 per cent. strength, saturated with oxides of nitrogen, and the upper layer of nitric acid and oxides of nitrogen without water. The upper layer is returned to the process with more water or dilute acid, and the lower layer is concentrated to 94-97 per cent. strength.

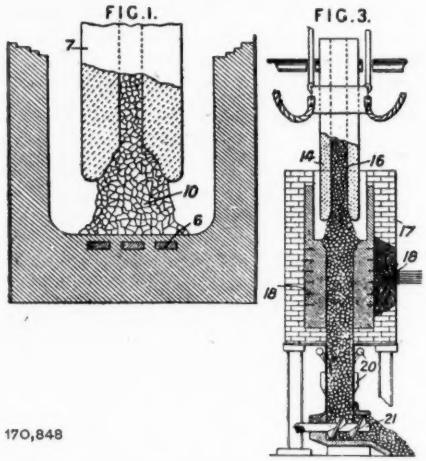
170,845. Furnaces. R. B. Kernohan and J. S. Lockhead, Pittsburg, U.S.A. International Convention date, October 29, 1920.

Gas and air are supplied under pressure to a gas-fired reversible regenerative open-hearth furnace and are mixed in the inlet port. The supply which is under the greater pressure is delivered obliquely into the other stream. Ports for a supplementary air supply are also provided.

170,848. Electric Furnaces. Norske Aktieselskab for Elektrokemisk Industri Norsk Industri-Hypotekbank, 24, Toldbodgaten, Christiania. International Convention date, November 1, 1920.

The furnace is used for the conversion of anthracite and coke into graphite and for the manufacture of carborundum, nitrides, carbides, cyanides, cements, and for the burning of limestone. The material is introduced through a vertical electrode which is hollow or channelled, and the heating is effected by the passage of current through it. In one form, anthracite is introduced through the hollow electrode 7 and current passes through it to the conductors 6. The electrode is gradually raised, leaving a sintered column 10. The electrode is of large cross-section so that the crater acts as a screen over the part of greatest heat. In another form, coke is fed through an electrode packed round with iron ore. In another

form, anthracite 16 is fed through an electrode 14 having a metallic mantle, to a furnace which is lined with carbonaceous material containing annular conductors 18. The anthracite is converted into graphite which is cooled by water-pipes



20 and withdrawn by a screw 21. In another form, two vertical electrodes are used, coke being fed through the upper electrode, while the material is fed around the outside of the electrodes.

170,861. TIN, RECOVERING FROM TIN-PLATE. Victoria Iron Rolling Co. Proprietary, Ltd., 105, Dudley Street, West Melbourne, Australia. International Convention date, October 30, 1920.

A copper vat or an iron vat lined with copper is provided with copper troughs 4 around the sides, filled with copper oxide and covered by asbestos 7 and wire mesh 6. The vat contains a caustic alkali, and the tin is dissolved from tin-plate scrap by the alkali, when in contact with copper. The copper oxide prevents polarisation by its reduction to copper, and the tin is dissolved as sodium stannite. In a modification, the tin-

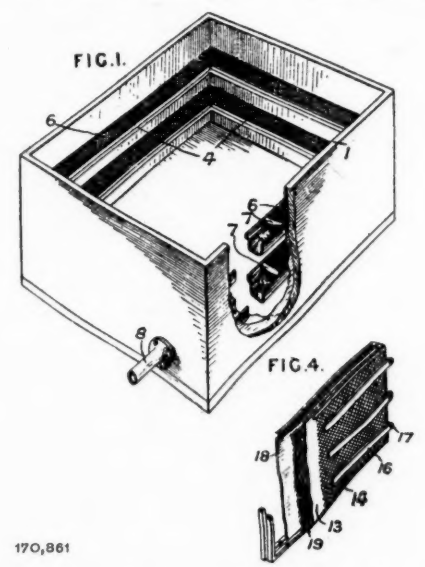


plate scrap is placed in a basket of wire mesh and an electrode is provided consisting of a flat or corrugated copper plate 18 coated with copper oxide. If the plate is flat, the oxide is retained by a wire mesh 19. The plate is covered by sheets of asbestos 13, and the asbestos by wire mesh 14. When the tin is dissolved, the iron scrap is removed and the solution electrolysed with iron cathodes. Tin is deposited on the cathodes, the reduced copper is reoxidised, and caustic soda is regenerated. Alternatively, the tin solution may be drawn off and electrolysed separately, and the copper reoxidised by moistening with caustic soda.

170,867. TETRAHYDRONAPHTHALENE DERIVATIVES. G. Schroeter, 56, Luisenstrasse, Berlin, and W. Schrauth, 8, Kohlenstrasse, Rosslau, Anhalt, Germany. International Convention date, March 16, 1916.

The process is for reducing the nitro-derivatives of tetrahydronaphthalene, its homologues and substitution products described in specification 148,923 (*see* THE CHEMICAL AGE, Vol. III., p. 518) to the corresponding amino compounds. In examples, a mixture of the α- and β-nitro derivatives of tetrahydronaphthalene is reduced to the amino compounds, and the dinitro derivative is reduced to the nitro-amino or diamino compound. The α- and β-amino compounds are fractionally crystallised from the hydrochlorides and may be converted into acetyl compounds. Azo, azoxy, hydroxylamine, or hydrazo compounds may be obtained at intermediate stages of the reduction.

Specifications Accepted, with Date of Application

155,572. Zinc dust, Process and apparatus for the production of. R. Seiffert. December 12, 1919.
165,771. Dioxyperylene, Process for the manufacture of. A. Zinke, July 2, 1920.
172,035. Carbon for pigmental and other purposes, Manufacture of. J. Nelson, May 21, 1920.
172,046. De-tinning iron, Process for. Thermal Industrial and Chemical (T.I.C.) Research Co., Ltd., and J. S. Morgan. June 8, 1920.
172,048. Tanning agents, Manufacture of. A. G. Bloxam. (*Gerb.-und-Farbstoffwerke H. Renner & Co.*). June 25, 1920.
172,056-7. Azo-dyestuffs, Manufacture of easily soluble, diazotisable. O. Y. Imray. (*Soc.* of Chemical Industry in Basle.) July 23, 1920. 172,057 addition to 172,056.
172,067. Pulverising ore and the like, Apparatus for. G. Johnston. July 30, 1920.
172,074. Sulphur from sulphuretted hydrogen and ammonium sulphide and gases containing such, Recovery of. E. E. Naef. August 19, 1920.
172,087. Alumina, Extraction of. D. Tyrer. August 24, 1920.
172,101. Sulphide ores. Treatment of complex. W. G. Perkins. August 28, 1920.
172,173. Distilling carbonaceous material, Process for. G. W. Wallace. September 30, 1920.
172,177. Dyestuffs, Manufacture of. O. Y. Imray (Soc. of Chemical Industry in Basle). October 2, 1920.
172,199. Metallurgical coke, Manufacture of. J. W. Leadbeater. November 2, 1920.
172,205. Bichloride of mercury, Manufacture of. K. Schantz. November 5, 1920.
172,250. Liquid soaps containing water, or their fatty acids, Treatment of. Henkel et Cie. December 16, 1920.

Applications for Patents

Chemische Fabrik in Billwärder vorm. Hell & Sthamer Akt.-Ges. and Weil, L. Process of producing high-percentage pure anthracene. 33,645-6. December 14. (Germany, December 17, 1920.)
Cleworth, Wheal, & Co., Ltd., and Parkinson, G. H. Apparatus for filtering, cooling, humidifying, &c., air or gas with liquid. 33,400. December 12.
Crosfield & Sons, Ltd., J., and Hilditch, T. P. Methanation of water-gas and manufacture of methane. 33,661. December 14.
Dreyfus, H. Manufacture of cellulose derivatives. 33,355, 33,357. December 12.
Dreyfus, H. Treatment of cellulose and production of cellulose derivatives. 33,356. December 12.
Dyson, H. G. T. Flush chemical valve. 33,980. December 17.
Farbenfabriken vorm. F. Bayer & Co. and Engelhardt, A. Process for separating or isolating organic gases or vapours of organic products. 33,944. December 16.
ffiske, G. E. Device for raising liquids. 34,014. December 17.
Gulf Refining Co. and Hadden, R. Recovery of aluminium chloride. 33,370. December 12.
Koch, M. Manufacture of pure nitro-carbonic acid mixture from combustion gases. 33,441. December 13. (Germany, December 14, 1920.)
National Aniline & Chemical Co., Inc. Production of vat dyes. 33,672. December 14. (United States, July 20.)
National Aniline & Chemical Co., Inc. Method of effecting caustic fusions. 33,675. December 14. (United States, June 17.)
National Aniline & Chemical Co. Inc. Production of vat dye-stuffs. 33,682. December 14. (United States, June 17.)
National Aniline & Chemical Co., Inc. Production of vat dye-stuffs. 33,684. December 14. (United States, July 2.)
Officine Elettrochimiche Dr. Rossi and Toniolo, C. Manufacture of nitric acid from gases obtained through oxidation of ammonia. 33,960. December 16. (Italy, December 20, 1920.)

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

British Market Report

Thursday, December 22, 1921.

FOR the time of year the demand for chemicals is fairly satisfactory, but orders, although fairly numerous, are generally on the small side.

Broadly speaking, prices are inclined to be firmer. The export demand has been slower than just recently, with no outstanding feature.

General Chemicals

ACETONE is a firm market and is in steady request.

ACID ACETIC is in fairly active demand, and prices are very firm. There has been a considerable inquiry for export.

ACID CITRIC is unchanged.

ACID FORMIC.—A better business is reported, and higher prices are not unlikely.

ACID OXALIC has been in good demand for export, and the home trade shows a little improvement; the price is slightly higher.

ACID TARTARIC is unchanged and uninteresting.

ARSENIC presents no special feature.

BLEACHING POWDER remains slow of sale, but the price seems to be at the bottom.

COPPER SULPHATE is a shade firmer.

FORMALDEHYDE.—A fair business is passing, and prices are unchanged.

IRON SULPHATE is in poor demand; price nominally unaltered.

LEAD ACETATE.—No business is to be detected, and there are no signs of an early improvement.

LEAD NITRATE remains uninteresting.

LITHOPONE is only in small demand, although price changes seem likely to be in an upward direction.

POTASSIUM CARBONATE.—There is still an excess of stock, and until that is cleared there is likely to be little improvement in the situation.

POTASSIUM CAUSTIC remains slow of sale.

POTASSIUM CHLORATE.—Only a small business is reported at recent figures.

POTASSIUM PRUSSIATE.—There has been a considerable advance in the continental price, and the firmer tendency may shortly be expected to be reflected here.

SODIUM ACETATE.—The demand has been decidedly brighter, and the article is firm in tone.

SODIUM CAUSTIC.—No special feature.

SODIUM NITRITE is a very slow market, but stocks are in firm hands.

SODIUM PRUSSIATE.—A fairly active business is reported for the first month or two of next year; makers are well sold.

Coal Tar Intermediates

Business during the past week has continued fairly good, though no very large volume of goods is passing as yet. The general tendency continues more favourable than has been the case for some time past, and the outlook for 1922 seems fairly cheerful.

ALPHA NAPHTHOL continues quiet.

ALPHA NAPHTHYLAMINE continues to pass into consumption at recent figures.

ANILINE OIL AND SALT are very firm and in good demand.

BENZIDINE BASE.—A fair business is passing, and this material looks more interesting than has been the case of late.

BETA NAPHTHOL is quiet, but with a better tendency.

DIMETHYLANILINE continues in demand.

DIPHENYLAMINE is in good demand, and stocks are not excessive.

"H" ACID is featureless.

NITROBENZOL is easy.

PARANITRANILINE is steady and small business passing.

RESORCIN is steady.

Coal Tar Products

The market generally in coal tar products remains fairly steady. In some cases there is an actual shortage of supply for prompt delivery.

90's BENZOL is obtainable at 2s. 6d. per gallon, either for prompt or forward.

PURE BENZOL is fairly quiet, and is quoted at 3s. on rails in the Midlands and 3s. 6d. to 3s. 9d. in London.

CREOSOTE OIL is in good demand for prompt delivery, and is quoted at 6d. on rails in the North and 6½d. in the South. A fair amount of business has been done for forward at prices from 5d. to 5½d. in the North and 6d. in the South.

CRESYLIC ACID is weak, and little business is passing, the pale quality being worth 2s. to 2s. 1d. on rails and the dark quality from 1s. 9d. to 1s. 10d.

SOLVENT NAPHTHA is inactive, and is worth about 2s. 5d. on rails in the Midlands and 2s. 9d. to 2s. 10d. in London.

NAPHTHALENE is also quiet and there is little business doing.

PITCH.—The market remains firm, and the demand is well maintained. Prices have an upward tendency and to-day's quotations are 62s. 6d. to 65s. f.o.b. London; 60s. to 62s. 6d. f.o.b. east coast port; 57s. 6d. to 60s. f.o.b. west coast port.

Sulphate of Ammonia

The position is unchanged; the demand is satisfactory, and prices are maintained.

Current Prices

Chemicals

	per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	1	10	to	0	2	0
Acetone oil	ton	87	10	0	to	90	0	0
Acetone, pure	ton	87	10	0	to	90	0	0
Acid, Acetic, glacial, 99-100%	ton	52	10	0	to	55	0	0
Acetic, 80% pure	ton	45	0	0	to	48	0	0
Arsenic	ton	95	0	0	to	100	0	0
Boric, cryst	ton	65	0	0	to	68	0	0
Carbolic, cryst. 39-40%	lb.	0	0	6½	to	0	0	7
Citric	lb.	0	2	4	to	0	2	5
Formic, 80%	ton	65	0	0	to	67	10	0
Gallic, pure	lb.	0	3	10	to	0	4	0
Hydrofluoric	lb.	0	0	8½	to	0	0	9
Lactic, 50 vol	ton	40	0	0	to	43	0	0
Lactic, 60 vol	ton	43	0	0	to	45	0	0
Nitric, 80 Tw	ton	38	0	0	to	40	0	0
Oxalic	lb.	0	0	8	to	0	0	8½
Phosphoric, 1.5	ton	45	0	0	to	47	0	0
Pyrogallic, cryst	lb.	0	7	3	to	0	7	9
Salicylic, Technical	lb.	0	1	2	to	0	1	3
Salicylic, B.P	lb.	0	1	5	to	0	1	6
Sulphuric, 92-93%	ton	8	0	0	to	8	10	0
Tannic, commercial	lb.	0	3	0	to	0	3	6
Tartaric	lb.	0	1	4	to	0	1	5
Alum, lump	ton	18	0	0	to	18	10	0
Alum, chrome	ton	37	10	0	to	40	0	0
Alumino ferric	ton	9	0	0	to	9	10	0
Aluminium, sulphate, 14-15%	ton	12	0	0	to	13	0	0
Aluminium, sulphate, 17-18%	ton	15	0	0	to	16	0	0
Ammonia, anhydrous	lb.	0	1	10	to	0	2	0
Ammonia, .880	ton	35	0	0	to	37	0	0
Ammonia, .920	ton	22	0	0	to	24	0	0
Ammonia, carbonate	lb.	0	0	4	to		—	
Ammonia, chloride	ton	60	0	0	to	65	0	0
Ammonia, muriate (galvanisers)	ton	45	0	0	to	47	10	0
Ammonia, nitrate	ton	55	0	0	to	60	0	0
Ammonia, phosphate	ton	90	0	0	to	95	0	0
Ammonia, sulphocyanide	lb.	0	3	0	to		—	
Amyl acetate	ton	150	0	0	to	160	0	0
Arsenic, white, powdered	ton	42	0	0	to	44	0	0
Barium, carbonate, 92-94%	ton	12	10	0	to	13	0	0
Barium, chlorate	lb.	0	0	11	to	0	1	0
Chloride	ton	15	0	0	to	16	0	0
Nitrate	ton	40	0	0	to	42	0	0

	Per	£	s.	d.		£	s.	d.
Barium Sulphate, blanc fixe, dry	ton	26	0	0	to	28	0	0
Sulphate, blanc fixe, pulp	ton	16	0	0	to	16	10	0
Sulphocyanide, 95%	lb.	0	1	6	to	0	1	0
Bleaching powder, 35-37%	ton	14	0	0	to		—	
Borax crystals	ton	31	0	0	to	32	0	0
Calcium acetate, Brown	ton	8	0	0	to	9	0	0
„ „ Grey	ton	10	0	0	to	11	0	0
Calcium Carbide	ton	22	0	0	to	23	0	0
Chloride	ton	8	10	0	to	9	0	0
Carbon bisulphide	ton	60	0	0	to	62	0	0
Casein, technical	ton	85	0	0	to	90	0	0
Cerium oxalate	lb.	0	3	6	to	0	3	9
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	11	0	to	0	11	6
Oxide, black	lb.	0	10	6	to	0	11	0
Copper chloride	lb.	0	1	3	to	0	1	6
Sulphate	ton	29	10	0	to	30	10	0
Cream Tartar, 98-100%	ton	125	0	0	to	130	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde 40% vol	ton	85	0	0	to	90	0	0
Formusol (Rongalite)	lb.	0	3	9	to	0	4	0
Glauber salts, commercial	ton	5	5	0	to	5	10	0
Glycerine, crude	ton	70	0	0	to	72	10	0
Hydrogen peroxide, 12 vols	gal.	0	2	8	to	0	2	9
Iron perchloride	ton	30	0	0	to	35	0	0
Iron sulphate (Copperas)	ton	4	0	0	to	4	5	0
Lead acetate, white	ton	42	10	0	to	45	0	0
Carbonate (White Lead)	ton	44	0	0	to	47	0	0
Nitrate	ton	48	10	0	to	50	10	0
Litharge	ton	35	10	0	to	36	0	0
Lithopone, 30%	ton	26	0	0	to	28	0	0
Magnesium chloride	ton	12	0	0	to	13	0	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	9	10	0	to	10	0	0
Sulphate (Druggists')	ton	15	10	0	to	17	10	0
Manganese, Borate	ton	70	0	0	to	75	0	0
Sulphate	ton	70	0	0	to	75	0	0
Methyl acetone	ton	85	0	0	to	90	0	0
Alcohol, 1% acetone	ton	90	0	0	to	95	0	0
Nickel sulphate, single salt	ton	65	0	0	to	66	0	0
Nickel ammonium sulphate, double salt	ton	67	0	0	to	68	0	0
Potash, Caustic	ton	33	0	0	to	33	10	0
Potassium bichromate	lb.	0	0	7¾	to		—	
Carbonate, 90%	ton	31	0	0	to	33	0	0
Chloride 80%	ton	15	0	0	to	20	0	0
Chlorate	lb.	0	0	6	to	0	0	6½
Meta bisulphite, 50-52%	ton	112	0	0	to	120	0	0
Nitrate, refined	ton	45	0	0	to	47	0	0
Permanganate	lb.	0	0	11	to	0	1	0
Prussiate, red	lb.	0	2	4	to	0	2	6
Prussiate, yellow	lb.	0	1	2½	to	0	1	3
Sulphate, 90%	ton	20	0	0	to	22	0	0
Salammoniac, firsts	cwt.	3	5	0	to		—	
Seconds	cwt.	3	0	0	to		—	
Sodium acetate	ton	26	0	0	to	27	0	0
Arsenate, 45%	ton	45	0	0	to	48	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	6	to		—	
Bisulphite, 60-62%	ton	25	0	0	to	27	10	0
Chlorate	lb.	0	0	4¼	to	0	0	4½
Caustic, 70%	ton	24	0	0	to	24	10	0
Caustic, 76%	ton	25	10	0	to	26	0	0
Hydrosulphite, powder, 85%	lb.	0	2	3	to	0	2	6
Hyposulphite, commercial	ton	15	0	0	to	16	0	0
Nitrite, 96-98%	ton	37	10	0	to	40	0	0
Phosphate, crystal	ton	22	10	0	to	23	10	0
Perborate	lb.	0	1	4	to	0	1	6
Prussiate	lb.	0	0	8½	to	0	0	9
Sulphide, crystals	ton	15	0	0	to	17	0	0
Sulphide, solid, 60-62%	ton	24	10	0	to	25	10	0
Sulphite, cryst	ton	15	0	0	to	16	0	0
Strontium carbonate	ton	80	0	0	to	85	10	0
Strontium Nitrate	ton	70	0	0	to	72	10	0
Strontium Sulphate, white	ton	7	10	0	to	8	10	0
Sulphur chloride	ton	41	0	0	to	42	0	0
Sulphur, Flowers	ton	13	0	0	to	14	0	0
Roll	ton	13	0	0	to	14	0	0
Tartar emetic	lb.	0	1	6	to	0	1	7
Tin perchloride, 33%	lb.	0	1	2	to	0	1	4
Tin perchloride, solid	lb.	0	1	5	to	0	1	7
Protochloride (tin crystals)	lb.	0	1	5	to	0	1	6
Zinc chloride, 102 Tw	ton	21	0	0	to	22	10	0
Chloride, solid, 96-98%	ton	35	0	0	to	40	0	0
Oxide, 99%	ton	36	0	0	to	37	0	0
Dust, 90%	ton	47	10	0	to	50	0	0
Sulphate	ton	21	10	0	to	22	10	0

Coal Tar Intermediates, &c.

	Per	£	s.	d.		£	s.	d.
Alphanaphthol, crude	lb.	0	3	0	to	0	3	3
Alphanaphthol, refined	lb.	0	3	6	to	0	3	9
Alphanaphthylamine	lb.	0	2	3	to	0	2	6
Aniline oil, drums extra	lb.	0	1	5	to	0	1	6
Aniline salts	lb.	0	1	6	to	0	1	7
Anthracene, 40-50%	unit	0	0	3½	to	0	0	9
Benzaldehyde (free of chlorine)	lb.	0	3	9	to	0	4	3
Benzidine, base	lb.	0	5	6	to	0	6	0
Benzidine, sulphate	lb.	0	5	6	to	0	6	0
Benzoic acid	lb.	0	2	0	to	0	2	3
Benzoate of soda	lb.	0	1	9	to	0	2	0
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	0	5	9	to	0	6	0
Betanaphthol	lb.	0	2	0	to	0	2	2
Betanaphthylamine, technical	lb.	0	7	0	to	0	7	3
Croceine Acid, 100% basis	lb.	0	3	9	to	0	4	0
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	6	9	to	0	7	0
Dinitrobenzol	lb.	0	1	5	to	0	1	6
Dinitrochlorbenzol	lb.	0	1	4	to	0	1	5
Dinitronaphthaline	lb.	0	1	6	to	0	1	8
Dinitrotoluol	lb.	0	1	8	to	0	1	9
Dinitrophenol	lb.	0	2	9	to	0	3	0
Dimethylaniline	lb.	0	3	9	to	0	4	0
Diphenylamine	lb.	0	4	6	to	0	4	9
H-Acid	lb.	0	7	6	to	0	8	0
Metaphenylenediamine	lb.	0	5	6	to	0	5	9
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	6	6	to	0	7	0
Monosulphonic Acid (2.7)	lb.	0	7	0	to	0	7	6
Naphthionic acid, crude	lb.	0	4	0	to	0	4	3
Naphthionate of Soda	lb.	0	4	3	to	0	4	6
Naphthylamin-di-sulphonic-acid	lb.	0	4	9	to	0	5	0
Nitronaphthalene	lb.	0	1	4	to	0	1	5
Nitrotoluol	lb.	0	1	3	to	0	1	4
Orthoamidophenol, base	lb.	0	15	0	to	0	18	0
Orthodichlorbenzol	lb.	0	1	1	to	0	1	2
Orthotoluidine	lb.	0	2	3	to	0	2	6
Orthonitrotoluol	lb.	0	0	10	to	0	1	0
Para-amidophenol, base	lb.	0	11	0	to	0	11	6
Para-amidophenol, hydrochlor	lb.	0	11	6	to	0	12	0
Paradichlorbenzol	lb.	0	0	7	to	0	0	8
Paranitraniline	lb.	0	4	6	to	0	4	9
Paranitrophenol	lb.	0	2	9	to	0	3	0
Paranitrotoluol	lb.	0	5	9	to	0	6	0
Paraphenylenediamine, distilled	lb.	0	12	0	to	0	13	0
Paratoluidine	lb.	0	7	0	to	0	7	6
Phthalic anhydride	lb.	0	3	9	to	0	4	0
Resorcin, technical	lb.	0	5	6	to	0	6	0
Resorcin, pure	lb.	0	7	6	to	0	7	9
Salol	lb.	0	2	4	to	0	2	6
Sulphanilic acid, crude	lb.	0	1	4	to	0	1	6
Tolidine, base	lb.	0	6	6	to	0	7	0
Tolidine, mixture	lb.	0	2	6	to	0	2	9

French Potash

A good deal of buying interest has been evident for some time past, but it has been chiefly restricted to sylvinite 20 per cent. and French kainit 14 per cent., although a certain demand is being made for muriate of potash for mixing purposes. Sulphate of potash is scarcely being quoted, except in the special horticultural trade. Prices for all grades of potash are now particularly attractive, and despite the keen competition prevailing between sellers, the quotations made are generally uniform, a condition which is tending to give buyers much more confidence in making large purchases. No changes have been made in the prices quoted during the past month.

Scientific Research in Norway

In connexion with the proposed establishment of funds for scientific research in Norway, H.M. Minister at Christiania reports that grants have now been made for the following purposes: 8,000 kroner for experiments to be made in connexion with the use of acetylene gas as motor fuel; 24,000 kroner for the purpose of investigation in vitamins, with special application to cod liver oil; and 6,000 kroner to examine the possibility for employing calcium carbide as a basis for further manufacture in Norway.

German Chemical Trade Notes

(FROM OUR OWN CORRESPONDENT.)

Berlin, December 12.

BUT little that is favourable can be reported of the chemical market during the past week. The price-curve which met with a sharp break during the first week of December has gone further downward. The sudden dropping of prices after a period of many months during which prices steadily advanced has caused surprise. Generally holders of stocks taken on some time since at high prices are not financially able to stand the strain of holding the material until the market turns again, and it is evident that depression is to be expected unless the situation changes soon. In most lines the right sort of business at present can be placed below quoted prices, as not one of the numerous stockholders would allow an order to escape if a slight concession in price would result in business. The situation is rather open as long as the prospects of the moratorium project are uncertain; to-day the price tendency almost approaches price slashing, and occasionally quotations are broken sharply by sellers whereas buyers are on the reserve. There are strenuous efforts to improve the tone of the market, and despite the conservative character of the buying, signs of recovery could be discerned at the beginning of this week.

Pharmaceutical products are not meeting with much demand, but there are still orders from abroad on hand to be covered. Quotations for the most favoured products are, in marks per kilogram (d=domestic price; e=export price):

Acetanilide, 80 mk. d., 90 mk. e. Acetyl-Salicylic-Acid, 180 mk. d., 200 mk. e. Citric Acid, 240 mk. d., 255 mk. e. Benzoic Acid, 250 mk. d. Salicylic Acid, 66 mk. d., 72 mk. e. Tartaric Acid, 76 mk. d., 78 mk. e. Ammonium Carbonate, powdered, 13 mk. d., 17 mk. e. Antipyrin (Phenazone), 400 mk. d., 440 mk. e. Aspirin powder, 450 mk. d., 470 mk. e.; tablets in cardboard rolls, 10 mk. each d., 12 mk. e.; tablets in glass tubes, 17 mk. each d., 24 mk. e. Bromides: Ammonia, 66 mk. d. Potassium, 50 mk. d., 55 mk. e. Sodium, 61 mk. d. Caffein, pure, 1200 mk. d. Camphor, Japan, 700 mk. d. Chloral Hydrate, 115 mk. d. Chloride of Gold, 130.000 mk. d. Chloroform, 50 mk. d. Cocaine Hydrochloride, 16.500 mk. d. Corrosive Sublimate, 330 mk. d. Cream of Tartar, 97 mk. d. Eserin, Sulphate, 54.000 mk. d. Salicylate, 43.000 mk. d. Formaldehyde, 30%, 21 mk. d., 30 mk. e. Hexamethylene-Tetramine, 190 mk. d. Hydroquinone, 230 mk. d. Potassium Iodide, 1.500 mk. d., 1.550 mk. e. Sodium Iodide, 2.460 mk. d. Iodine, 2600 mk. d. Iodoform, 2988 mk. d. Menthol, 3.600 mk. d. Mercuric Iodide, 1.900 mk. d. Methylene Blue, 570 mk. d. Morphine Hydrochloride, 16.000 mk. d. Opium, Guévé, 12%, 1.600 mk. d.; Guévé, 10%, 1.350 mk. d. Phenacetin, 370 mk. d., 400 mk. e. Phenolphthaleine, 315 mk. d. Potassium Cyanide, 98/100%, 70 mk. d. Potassium Permanganate, 55 mk. d., 58 mk. e. Protargol (Silver Protein), 675 mk. d. Pyramidon, 1.200 mk. d., 1.250 mk. e. Quinine Hydrochloride, 12.000 mk. d. Resorcin, 315 mk. d. Salol, 160 mk. d., 180 mk. e. Silver Nitrate, 3.100 mk. d. Strychnine Nitrate, 5.700 mk. d. Sulfonal, 650 mk. d. Theobromine, 1.620 mk. d. Thymol, 1.750 mk. d. Vanilline, 100%, 3.100 mk. d., 3.150 mk. e. Veratrin, 5.500 mk. d. White Precipitate, 395 mk. d.

Industrial chemicals were rather neglected except alkalis which maintained their favourable position. Quotations were as follows: Acetic Acid, 80%, 19.80 mk. d. Boracic Acid, crystallised, 80 mk. d. Muriatic Acid, crude, 20°-22° Bé, 4.75 mk. d. Nitric Acid, 19° Bé, 8 mk. d. Oxalic Acid, 98/100%, 48 mk. d., 54 mk. e. Phosphoric Acid, 25%, 9.75 mk. d. Sulphuric Acid, 66°, Bé 5.50 mk. d. Tannic Acid, 225 mk. d. Alum, lumps, 8.50 mk. d., 10 mk. e.; powder, 7.50 mk. d. 9.25 mk. e. Anthracene Oil, 2.85 mk. d. Sal Ammoniac, 27.50 mk. d., 30 m. e. Sal Ammoniac Spirit, 0.910, 6.25 mk. d, Barium Chloride, 7.50 mk. d., 10 mk. e. Bleaching Powder, 80%, 6 mk. d., 6.50 mk. e. Borax, crystallised, 31 mk. d. Blanc Fixe, 2 mk. d., 2.40 mk. e. Caustic Potash, 88/92%, 20 mk. d., 25 mk. e. Caustic Potash Liquor, 50° Bé, 17.50 mk. d., 21 mk. e. Caustic Soda, 125/128, 32 mk. d., 26 mk. e. Caustic Soda Liquor, 38°/40°, 13 mk. d. Copperas, 2.50 mk. d. Copper Sulphate, 98/100%, 16.75 mk. d., 19.50 mk. e. Epsom Salt, 1.45 mk. d. Glauber's Salt cryst., 1.70 mk. d., 3 mk. e. Magnesium Chloride, fused, 5 mk. d. Lead Acetate, 28 mk. d., 29 mk. e. Lead, Red, 29 mk. d., 32 mk. e. White Lead, powdered-dry, 31 mk. d., 35 mk. e.; in oil, 32 mk. d., 37 mk. e. Litharge, 28 mk. d., 33 mk. e. Lithopone, Red-Seal, 11 mk. d., 16.50 mk. e. Potash Carbonate, 96/98%, 23 mk. d., 26 mk. e. Potash Chlorate, 18 mk. d., 22 mk. e. Salt Cake, 96/98%, 2.40 mk. d., 3.75 mk. e. Soda Ash, 96/98%, 8 mk. d., 8.50 mk. e. Soda Sulphide, 30/32%, 16 mk. e.; 60/62%, 23 mk. e. Fine Chloride, 17.75 mk. d. Zinc Sulphate, 8 mk. d. Zinc, White, Red-Seal, 18 mk. d., 30 mk. e.

Cassel Cyanide Company

SPEAKING at the annual meeting of the Cassel Cyanide Co., Ltd., in Glasgow, on December 14, Sir George Beilby (the chairman), referring to the decline in profits—the trading account showed a profit of £56,774 as against £91,633 last year—said the coal strike bore heavily on the operations, and in addition to this the shipments showed a decrease of 25 per cent. as compared with last year. The competition from both America and the Continent for Mexican business had been severe, and for the time being they had been forced to yield ground in this important market. Shipments to South Africa had been on a much smaller scale compared with last year, due mainly to consumers living on their stocks, a policy which could be understood in view of falling prices and the uncertain outlook for the low grade mines. The Australian market was going from bad to worse, the consumption of cyanide there being only one-third of what it was in pre-war times. In Northern Ontario, however, there was some activity, but taken as a whole the state of the world's gold mining industry was by no means encouraging. The hope was that there would be some recovery in the near future. The outlook for silver mining, however, was better, and in this direction they expected an improved demand for cyanide. It was gratifying to be able to report progess in reduction of manufacturing costs, and all possible steps were being taken to strengthen the position in this respect. Sir George also referred to an extension of the working agreement with the Castner-Kellner Alkali Co. and of an interchange of directors. Under this arrangement Mr. A. T. Smith, managing director of the Castner-Kellner Alkali Co., Ltd., was elected a director of the Cassel Cyanide Co., Mr. William Neill, managing director of the latter company, having recently been elected to the Castner-Kellner board. It was felt that this closer co-operation would be to the mutual benefit and would give a firmer footing to the alliance.

Chemical Merchant's Affairs

THE receiving order in the matter of Emil Frederick Bush, 120, High Road, New Southgate, Middlesex, colour and chemical merchant, was made recently on the debtor's own petition. The statement of affairs shows liabilities of £2,327 os. 8d., against assets estimated to realise £2,834 6s. 2d., from which preferential claims of £46 14s. 4d. have to be deducted, leaving net assets of £2,787 11s. 10d., or a surplus of £460 11s. 2d. The debtor does not admit insolvency. It appears that in August, 1918, he started business on his own account as a colour and chemical merchant with £300 capital, his savings. In June, 1920, he removed to his present premises, having purchased the leasehold premises for £400. He paid £200, and raised a mortgage in respect of the balance, subsequently reducing the amount to £140. The mortgage was subsequently paid off with assistance from the bank. Until a year ago the turnover of the business amounted to about £2,000 a month, and had since dropped to £200 a month owing to general depression in trade, and debtor stated that his present position was brought about by having purchased too large a stock, by depreciation, and illness during the last three years. A private meeting of the creditors was held on October 25, last, when a deed of assignment was proposed, but as some of the creditors would not agree, he filed his petition.

Victor Blagden and Co., Ltd

VICTOR BLAGDEN & Co., 4, Lloyd's Avenue, London, E.C. 3, announce that they have converted their business into a private limited company as from December 1, 1921, under the name of "Victor Blagden & Co., Ltd." There will be no change whatever in the conduct of the business, which will be continued by the company under precisely the same management as heretofore, that is to say, Messrs. Victor Blagden, E. T. Vieusseux, and R. R. Wilkins will be directors, and Mr. Victor Blagden will be the chairman of the board.

Company News

UTAH COPPER CO.—A dividend of 50 cents. will be paid on December 31, to stockholders registered on December 16.

ANGLO-AMERICAN OIL CO., LTD.—An interim dividend on the preference shares free of British income-tax, is payable on January 16 next.

RECKITT & SONS.—The directors announce an interim dividend of 6d. per share, less tax, on the ordinary shares, payable on January 2 next.

PINCHIN, JOHNSON & CO., LTD.—The transfer books are closed from December 19 to 31 for the preparation of dividend warrants.

BRADFORD DYERS' ASSOCIATION.—The transfer registers of the preference shares and debenture stock are closed from December 19 to 31 inclusive.

YORKSHIRE DYEWARE AND CHEMICAL CO.—The directors announce an interim dividend of 2½ per cent., less tax, on the ordinary shares payable on January 2 next.

INDO-BURMA OILFIELDS (1920), LTD.—At a meeting on December 16, resolutions for altering the articles of association passed at the general meeting held on December 1 were duly confirmed.

BROKEN HILL PROPRIETARY CO., LTD.—Coupon No. 15 of the 6 per cent. debentures will be paid on and after January 2 next, at the Commonwealth Bank of Australia, 36-41, New Broad Street, London, E.C.

WILLIAM GOSSAGE & SONS, LTD.—The transfer books of the 6½ per cent. cumulative preference shares are closed from December 19 to 31 inclusive for the preparation of dividend warrants due on January 1 next.

UNITED PREMIER OIL & CAKE CO.—An interim dividend of 2½ per cent. (6d. a share) on the ordinary shares for the year ending December 31 is payable on January 16 next. A year ago the dividend was 7½ per cent.

ESPERANZA NITRATE CO., LTD.—A general meeting of the holders of the "B" Prior Lien Bonds will be held at 140, Dashwood House, New Broad Street, London, E.C., on December 29, at 2.30 p.m., to consider a further Supplemental Trust Deed.

HARRISONS & CROSFIELD, LTD.—The directors announce dividends on the cumulative preference shares at the rate of 6 per cent. per annum, less tax, for the three months to December 31; and on the preferred ordinary shares at the rate of 10 per cent. per annum, less tax, for the six months to December 31. Warrants will be posted on December 31 to holders on the register at that date, including approved transferees whose transfers were lodged at the company's office not later than December 15.

PORT LINCOLN COPPER CO.—The accounts for the two years to June 30 last were submitted at the general meeting held on Tuesday. The balance sheet, as at June 30 last, shows: Debit—Issued capital, £311,536; forfeited share account, £9,594; sundry creditors, £1,358; advances, £800; total, £323,288. Credit—Mining rights at Tumby Bay, £259,000; leasehold land and mining rights at Kitticoola, £700; stamp duties and preliminary expenses, £2,777; Tumby Bay expenditure, £17,280; Kitticoola expenditure, £32,639; cash at bank and in hand, £11; sundry debtors, £51; London expenditure, £10,830; total, £323,288.

PEACHEY PROCESS CO., LTD.—Speaking at the annual meeting held on December 15, Sir J. P. Hewett (the chairman) said the liabilities in the balance sheet included a sum of £62,420 paid up on account of preference and ordinary shares up to date, for which the accounts were presented. The item of £2,822 owing the sundry creditors had since been paid off, and now they had practically no payments to make other than the responsibilities for the capital raised. The cost of the Willesden works was shown on the assets side of the balance sheet as £8,930, but owing to additional costs for buildings, &c., the total now, with the cost of the land, amounted to £13,281. When the balance sheet was closed they had in hand a sum of £10,895. The repayment of the mortgage and other expenses had reduced the balance to a little over £2,000. They had thus been able to float the company, pay all initial expenses, purchase the patents, purchase and equip the works, and pay all administrative expenses for nearly a year and a half by calling up only 12s. 6d. per share. A report of the meeting appears on another page.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT.	MATERIALS.	REF. No.
Warsaw.....	Copper and other metals.....	533
Barcelona ...	Sulphate of Ammonia	539
Buenos Aires..	Centrifugal pump, &c. Particulars from Department of Overseas Trade (Room 50), 35, Old Queen Street, London. (Ref. No. D. O. T. 5073/FL./S.C.)	—
Argentina ...	Perfumery, toilet articles.....	546
Rio de Janeiro	Chemicals, especially soda ash and caustic soda; metals; lubricating oils; paints.	547

The Genesis of Ore Deposits

LECTURING at a recent meeting of the Chemical Society, held at the Institution of Mechanical Engineers, Professor J. W. Gregory said the scientific study of ore deposits was founded in Saxony from the work of Bauer in 1546 to that of Werner in 1791. In recent years great stress had been laid on the process of magmatic segregation in ore formation, but though that process doubtless caused that great reservoir of ores, the metallic core of the earth, the amount of ore thus formed which could be mined under present conditions was relatively insignificant. The two leading cases of ores which were attributed to formation as igneous rocks by magmatic segregation, were the nickel ores of Sudbury and the iron ores now worked in Swedish Lapland, and the evidence appeared strongly in favour of these ores being due to solutions acting on solid rocks, so that those ores were aqueous and not igneous. Though magmatic segregation had contributed little to the formation of ores, magmatic solution was of the highest importance, for all the juvenile waters of the earth's crust were magnetic, and nearly all primary ores were due to them. Primary aqueous ores, ranging from the contact ores near the deep-seated igneous masses to the mercury ores deposited at the summit of the great fracture planes formed during the major mountain uplifts were due to varieties of one process, the essential unity of which it was important to recognise in the classification of this group of ores.

Alleged Superiority of German Dyes

LECTURING on "Wool in Relation to Dyeing" at a meeting of the West Riding Section of the Society of Dyers and Colourists, held in Bradford on December 15, Mr. J. W. Radcliffe expressed the opinion that the Government had made a mistake in imposing restrictions on the importation of foreign dyes. With English dyes, he said, we did not obtain that brightness of colour which we got from the same classified German dyes. Our export trade inevitably suffered because our competitors, to whom the German dyes were freely available, were in a position to get better colour effects in cloths manufactured from the same qualities of raw materials.

In support of his contention, Mr. Radcliffe referred to the contracts now in the hands of several West Riding manufacturers for "mignonette" khaki for Serbia. The wools used for this material were, in the first instance, dyed separately in several shades, including blue, lavender, red, and indigo, and then, in the necessary proportions, blended to produce the colour required. When British dyestuffs had been employed, it was found, after the processes of milling and scouring, that the colour of the cloth was much flatter than was the case if German or Swiss dyes had been used. It was, perhaps, in the scarlet dye that Germany had the strongest advantage over our own products. Referring to "resist" dyeing, the lecturer said that yarns submitted to this process in England came up considerably weaker than those similarly treated on the Continent. He expressed the hope that this would be rectified, and that the research work now going on in England would ultimately enable our manufacturers to get equally good results from the use of British dyestuffs.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette

Partnerships Dissolved

BROWN, Robert, and COCKCROFT, Lawrence Williamson, oil merchants, 15, Manor Square, Otley, co. York, under the style of The Wharfedale Oil Co., by mutual consent as from December 13, 1921. Debts received and paid by L. W. Cockcroft.

EVANS, Alfred Henry, GRAY, John Frank, and HOOD, William, wholesale drug and spice merchants, 13, Fish Street Hill, and 8 and 10, Pinchin Street, Stepney, London, under the style of Evans, Gray and Hood, by mutual consent as from December 15, 1921, so far as regards J. F. Gray, who retires from the firm. Debts received and paid by A. H. Evans and W. Hood, who will continue the business.

SHORE, Richard, and BOYDEN, Alfred Ernest, Park Chemical Works, Woolfold, Bury, under the style of Boyden & Co., by mutual consent as from September 30, 1921. Debts received and paid by A. E. Boyden, who will continue the business.

Notice of Intended Dividend

PARROTT, William Searle, 79, High Street, Watford, co. Hertford, and 61, The Broadway, Queen's Road, Watford, chemist, &c. Last day for receiving proofs, December 24. Trustee, Thomas Gourlay, 29, Russell Square, London, W.C. 1.

Companies Winding Up Voluntarily

BLANKLEYS CHEMISTS, LTD, George Reginald Griffin, 43, Cannon Street, Birmingham, appointed liquidator.

EGYPTIAN POWER & NITROGEN SYNDICATE, LTD. Mr. J. S. Mallam, 1, Queen Victoria Street, London, E.C. 4, appointed liquidator.

Liquidator's Notice

TIMMINS DRUG STORES, LTD. Particulars of claims to W. H. E. Sparkes, 60, Scarborough Street, West Hartlepool, the liquidator of the company.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

ASBURY, Thomas, 56, Baggeholme Road, Lincoln, chemist, £35 11s. October 20.

BANNISTER & CO., 257, High Street, Smethwick, dyers and cleaners, £20 8s. 2d. October 11.

BARRICK & BUDDS SOAP CO., Back Eaves Street, Blackpool, soap manufacturers. £54 15s. 11d. October 7.

BETTS, Mr., 161-163, East Street, Bedminster, chemist, £10 13s. 6d. October 27.

BICKLEY, Mr., Moreton Pharmacy, Moreton, chemist. £21 3s. 2d. October 27.

EDWARDS, James Maconochie, 311, Fulham Palace Road, chemist, £11 10s. 3d. October 19.

GREEN, Rudolph, 17, Claremont Road, E. 7, chemist. £11 5s. October 7.

LLEWELLYN, Willie, 135, Dunraven Street, Tonypandy, chemist, £19 6s. 1d. October 19.

MORRIS, William, 21, Vicarage Hill, Rhostyllen, near Wrexham, druggist, £11 6s. 10d. October 19.

PRICE, R., & SONS, 270, Bute Street, Cardiff, chemists, £15 15s. October 18.

Receivership

RUSSELL OIL & CHEMICAL CO., LTD. W. G. Hall, of Camomile Chambers, Bishopsgate, E.C., was appointed receiver on November 29, 1921, under powers contained in debenture dated March 3, 1920.

Bill of Sale

[*The undermentioned information is from the Official Registry. It includes Bills of Sale registered under the Act of 1882 and under the Act of 1878. Both kinds require re-registration every five years. Up to the date the information was obtained it was registered as given below; but payment may have been made in some of the cases, although no notice had been entered on the Register.*]

LOVELESS, John Robert, 1, Bacton Villa, Bacton Road, North Walsham, soap manufacturer. December 19. £30.

New Companies Registered

The following list has been prepared for us by Jordan & Sons, Ltd., company registration agents, 116 and 117, Chancery Lane, London W.C.2:—

A. W. COLES, LTD., 15, The Arcade, Okehampton, Devon. Chemists and druggists. Nominal capital: £2,000 in 2,000 shares of £1 each. A director: A. W. Coles, 27, St. James Street, Okehampton, Devon.

COMBE DOWN DRUG STORES, LTD., Byfield House, Combe Down, near Bath, Somerset. Chemists and druggists' sundriesmen. Nominal capital, £500 in 500 shares of £1 each.

CREPHOS, LTD. Manufacturers, dealers and agents for chemicals, grain, flour, or meal of all kinds. Nominal capital, £400 in 8,000 shares of 1s. each. Subscriber: E. A. Smith, 603, Wandsworth Road, Clapham, S.W. 8.

ELECTRO-CHEMICAL MANURE CO., LTD., 52/53, Brown's Buildings, Exchange, Liverpool. Manure and fertiliser manufacturers. Nominal capital, £10,000 in 9,000 preference shares and 1,000 ordinary shares of £1 each.

Chemist's Wrongful Dismissal Claim Fails

AT the West Riding Assizes in Leeds, on December 16, Mr. Justice Salter heard a case in which Mr. John Schofield, chemist and consulting textile engineer, sued Littlewoods, Ltd., of Grove Mills, Hanley, for wrongful dismissal and for the recovery of money due to him as commission on the firm's profits according to the terms of a written contract. The sum of £215 was paid into court by the defendant company. On behalf of the plaintiff it was stated that he was employed by the defendants as chemist and general electrician, his particular work being to make analyses and tests in connexion with various processes in the finishing of woollen and worsted cloths. He had a written agreement to the effect that his services could only be terminated by six months' notice, but on February 24 last plaintiff was, it was alleged, wrongfully dismissed without proper notice. It was further stated that in 1913 plaintiff invented a new and secret process of bleaching cloth, and the old process was entirely superseded at the defendants' works. The company, however, did not patent the process, and had thus prevented the transfer of the patent to Mr. Schofield on the termination of his engagement. Large profits in the shape of greatly reduced cost of bleaching and increased output had resulted, but nothing had been paid to the plaintiff as his share of the profit according to the agreement.

While agreeing that a new process was substituted at the works, the defendants denied that it was a novel or secret process, or that it was invented or introduced by the plaintiff. They also denied the other allegations of wrongful dismissal.

Giving judgment for the defendants, his Lordship held that the process was not secret, because it was well known to other practical men in the neighbourhood. The plaintiff's claim for wrongful dismissal must fail, because he had committed an act of flagrant disobedience. On the understanding that the plaintiff accepted this as a final settlement the defendants agreed to forego costs.

Losses on a Soap Powder

A MEETING of the creditors of Mr. Frederick Lomax, carrying on business at Freeman Street, Birmingham, manufacturer's agent, was held at the offices of the Official Receiver, Birmingham, on December 15. The statement of affairs showed a deficiency of £1,703, and the debtor attributed his failure (*inter alia*) to loss upon exploiting a soap powder. The debtor stated that in 1919 he paid £30 for a patent washing powder which he had since unsuccessfully tried to get upon the market. The debtor admitted he had known of his insolvency since April, 1915, and his financial position had gradually got worse. The case was left in the hands of the Official Receiver.